

P.B. Stark: CV

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18. New Election Audit Targets Close Races. Laura Snider, *Daily Camera*, 26 November 2008. (risk-limiting audits, election integrity) <http://www.dailycamera.com/news/2008/nov/26/new-election-audit-targets-close-races/>
17. Counting Continues for Elections Department. *Redwood Times*, 19 November 2008. (risk-limiting audits, election integrity) http://www.redwoodtimes.com/local/ci_11023304
16. Checking It Twice. Julie J. Rehmeyer, *Science News*, 19 January 2008. (Election auditing) http://www.sciencenews.org/view/generic/id/9292/title/Math_Trek__Checking_It_Twice
15. *Reelz Channel Dailies* “Is it Real?” Reelz Channel, 15 June 2007. (gambling odds, probability)
14. Internet is 99 per cent porn free. Iain Thomson, *vnunet.com*, 15 November 2006. (Internet content filtering) <http://www.vnunet.com/vnunet/news/2168636/internet-per-cent-porn-free>
13. Internet Content Filters Fail to Block Sexually Explicit Material. Thomas Claburn, *Information Week*, 14 November 2006. (Internet content filtering) <http://www.informationweek.com/news/showArticle.jhtml?articleID=194300677§ion=All+Stories>
12. 1 percent of Web sites deemed pornographic. Maryclaire Dale, *Associated Press*, 14 November 2006. (Internet content filtering) <http://www.msnbc.msn.com/id/15721799/>
11. Only 1 percent of Web pages have porn? Declan McCullagh, *News.com*, 14 November 2006. (Internet content filtering) http://www.news.com/8301-10784_3-6135662-7.html
10. U.S., Google Set to Face Off in Court. Michael Liedtke, *Associated Press*, 14 March 2006. (Internet content filtering) <http://www.sfgate.com/cgi-bin/article.cgi?file=/n/a/2006/03/13/financial/f133050S47.DTL&type=printable>
9. Google privacy issue enters court. *Al Jazeera*, 14 March 2006. (Internet content filtering) <http://english.aljazeera.net/archive/2006/03/2008410131655473737.html>

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8. In Case About Google's Secrets, Yours Are Safe. Adam Liptak, *New York Times*, 26 January 2006. (Internet content filtering) <http://www.nytimes.com/2006/01/26/technology/in-case-about-google-secrets-yours-are-safe.html>
7. Google Resists U.S. Subpoena of Search Data. Katie Hafner and Matt Richtel, *New York Times*, 20 January 2006. (Internet content filtering) <http://www.nytimes.com/2006/01/20/technology/20google.html?pagewanted=1>
6. Feds take porn fight to Google. Declan McCullagh and Elinor Mills, *CNET News*, 19 January 2006. (Internet content filtering) <https://www.cnet.com/news/feds-take-porn-fight-to-google/>
5. *AFC NewSource* story on airline security [Airings: The Osgood File (CBS Radio Network), 29 July 2003, 18 February 2003; KRON-TV (San Francisco), 3 February 2003]. (statistical auditing, security) http://www.acfnewsresource.org/science/random_security.html
4. *The Fred Ebert Show* program on probability and statistics. KIRO 710, Seattle, WA, 27 October 2003. (live appearance re the Monty Hall problem, Statistics, Probability)
3. *ABC 7 News* story on census adjustment, 30 November 1998. (recorded appearance re census)
2. KQED-FM Forum program on the 2000 Census, San Francisco, CA, 17 July 1998. (live appearance re census) <http://www.kqed.org/radio/programs/forum/>
1. How deep is an earthquake? *Science News*, 2 March 1985. (Deep earthquakes)

Teaching and Advising

Courses

BerkeleyX 2.1x* <https://www.edx.org/course/uc-berkeleyx/uc-berkeleyx-stat2-1x-introduction-594>, an Introductory Statistics MOOC (52,661 students enrolled in first offering; 15.5% completion

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rate. As of 21 October 2015, this was one of the 50 most popular MOOCs of all time)

BerkeleyX 2.2x* <https://www.edx.org/course/uc-berkeleyx/uc-berkeleyx-stat2-2x-introduction-685>, an Introductory Statistics MOOC (20,871 students enrolled in first offering; 17% completion rate)

BerkeleyX 2.3x* <https://www.edx.org/course/uc-berkeleyx/uc-berkeleyx-stat2-3x-introduction-825>, an Introductory Statistics MOOC (22,443 students enrolled in first offering; 12% completion rate)

Introduction to Statistics (Statistics 2)

Introduction to Probability and Statistics (Statistics 20)

Introductory Probability and Statistics for Business (Statistics 21, N21*, W21*)

Introduction to Probability and Statistics for Scientists and Engineers (Statistics 25)

Societal Risks and the Law* (Statistics C79)

Freshman Seminar on Statistics (Statistics 39)

Statistical Inferences for Social and Life Scientists (Statistics 131A)

Concepts of Probability (Statistics 134)

Concepts of Statistics (Statistics 135)

Linear Modeling: Theory and Applications (Statistics 151A)

Nonparametric Inference and Sensitivity Auditing with Applications to Social Good* (Statistics 157)

Reproducible and Collaborative Statistical Data Science* (Statistics 157, now 159/259). Video review: <http://youtu.be/Bq71Pqdukeo>

Probability and Statistics for Physical Science and Engineering PhD Students*

Statistics for Engineering PhD students*

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Introduction to Probability and Statistics at an Advanced Level (Statistics 200A)

Theoretical Statistics (Statistics 210B)

Statistical Models: Theory and Applications (Statistics 215A, Statistics 215B)

Not enough Statistics for Journalists* (Journalism 219)

Statistics Masters Program Capstone* (Statistics 222)

Nonparametric and Robust Methods (Statistics 240)

Topics in Probability and Statistics (Statistics 260)

Statistical Consulting (Statistics 272)

* Course I created or co-created.

Former Graduate Students and Postdocs

Imola K. Fodor, Roche

Johann Gagnon-Bartsch, University of California, Berkeley

Christopher R. Genovese, Carnegie Mellon University

Niklaus W. Hengartner, Los Alamos National Laboratory

Janne Huttunen, University of Auckland and University of Kuopio

Bradley Luen, Indiana University

Tian Luo, U.S. Bureau of Labor Statistics

Dmitry I. Nikolayev, Schmidt Institute for Physics of the Earth

R. Jay Pulliam, University of Texas at Austin

Karthik Ram, University of California, Berkeley

Jeffery Regier, University of California, Berkeley

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Chad M. Schafer, Carnegie Mellon University

Daniel Turek, University of California, Berkeley

Vincent S. Yates, Yammer

Graduate Committees

1. Alameida, Jose, Mathematics. Ph.D. qualifying examination, 2008
2. Atz, Milos, Nuclear Engineering. Ph.D. qualifying examination, 2018
3. Bach, Andre, Physics. Ph.D. qualifying examination, 2011
4. Bar-Yossef, Ziv, Computer Science. Ph.D. qualifying examination, 2001; dissertation committee, "The Complexity of Massive Data Set Computations," 2002
5. Bein, Ed, Biostatistics. MA examination, 2002
6. Berny, Axel Dominique, EECS. Ph.D. qualifying examination, 2004; dissertation committee, "Analysis and Design of Wideband LC VCOs," 2006
7. Bertelli, E., IEOR. Ph.D. qualifying examination, 2018
8. Bloniarz, Adam, Statistics. Ph.D. qualifying examination, 2014
9. Bodik, Peter, Computer Science. Ph.D. qualifying examination, 2007; dissertation committee, "Automating Datacenter Operations Using Machine Learning," 2010
10. Bowman, John Penfield, IEOR. Ph.D. qualifying examination, 2003
11. Bunn, Emory Freeman, Physics. Ph.D. qualifying examination, 1994; dissertation committee, "Statistical Analysis of Cosmic Microwave Background Anisotropy," 1995
12. Burleigh, Kaylan, Astronomy. Ph.D. qualifying examination, 2016, 2017; dissertation committee, "A Monte Carlo Method for Identifying Imaging Systematics in Galaxy Surveys," 2018

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13. Burstein, Richard David II, Mathematics. Ph.D. qualifying examination, 2004; dissertation committee, "Hadamard Subfactors of Bisch-Haagerup Type," 2008
14. Buttrey, Samuel Edward, Statistics. Ph.D. qualifying examination, 1994; dissertation committee, "Nearest-Neighbor Classification with Categorical Variables," 1996
15. Calef, Brandoch Hugh, Applied Mathematics. Ph.D. qualifying examination, 1997; dissertation committee, "Optimal Sampling of the Discrete Fourier Transform," 2002
16. Charman, Andrew Emile, Physics. Ph.D. qualifying examination, 2003; dissertation committee, "Random Aspects of Beam Physics and Laser-Plasma Interactions," 2006
17. Chen, Raymond Lei, EECS. Ph.D. qualifying examination, 1993; dissertation committee, "A Qualitative Modeling Framework of Semiconductor Manufacturing Processes: Self-Learning Fuzzy Inference System and the Statistical Analysis of Categorical Data," 1994
18. Chien, George, EECS. Ph.D. qualifying examination, 1998
19. Fernandez, Arturo, Statistics. Ph.D. qualifying examination, 2017
20. Feldman, Arnold R., EECS. Ph.D. qualifying examination, 1995; dissertation committee, "High-Speed, Low-Power Sigma-Delta Modulators for RF Baseband Channel Applications," 1997
21. Fodor, Imola K., Statistics. Ph.D. qualifying examination, 1997; chair, dissertation committee, "Spectrum Estimation in Helioseismology," 1999
22. Fong, Keng Leong, EECS. Ph.D. qualifying examination, 1996; dissertation committee, "Design and Optimization Techniques for Monolithic RF Downconversion Mixers," 1997
23. Gagnon-Bartsch, Johann, Statistics. Ph.D. qualifying examination, 2009; co-chair, dissertation committee "Removing Unwanted Variation from Microarray Data with Negative Controls," 2012

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24. Gawiser, Eric Joseph, Physics. Ph.D. qualifying examination, 1998
25. Genovese, Christopher Ralph, Statistics. Ph.D. qualifying examination, 1992; chair, dissertation committee, "Statistical Problems in Helioseismology," 1994
26. Goldman, Megan, Biostatistics. Chair, Ph.D. qualifying examination, 2009
27. Gung, Yuan-Cheng, Geophysics. Dissertation committee, "Q Tomography of the Earth Mantle," 2003
28. Hansen, Bendek, Statistics. Chair, MA thesis committee, "Minimax Expected Length Confidence Intervals," 2000
29. Hansen, Mark Henry, Statistics. Chair, Ph.D. qualifying examination, 1992
30. Hengartner, Niklaus Walther, Statistics. Co-chair, dissertation committee, "Topics in Density Estimation," 1993
31. Higgins, Mike, Statistics. Ph.D. qualifying examination, 2009, 2010
32. Huang, Hsiang-Ping, Mathematics. Ph.D. qualifying examination, 1996
33. Huang, Jianhua, Statistics. Ph.D. qualifying examination, 1994; dissertation committee, "Topics in Extended Linear Modeling," 1997
34. Huang, Yuanlin, Civil Engineering. Ph.D. qualifying examination, 1993, 1994
35. Jiang, Xuesong, EECS. Ph.D. qualifying examination, 2001
36. Jones, David Morgan, Mathematics. Ph.D. qualifying examination, 1994; dissertation committee, "On Modular Galois Representations in Characteristic 3," 1998
37. Katsis, Dimitrios, EECS. Ph.D. qualifying examination, 2005
38. Kiesling, Max Karl, Civil Engineering. Ph.D. qualifying examination, 1994

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39. Kuusela, Mikael Johan, Statistics, École Polytechnique Fédérale de Lausanne, dissertation committee, “Uncertainty quantification in unfolding elementary particle spectra at the Large Hadron Collider,” 2016
40. Lara, Jose Daniel, Energy and Resources Group. Ph.D. qualifying examination, 2018
41. Li, Bo, Statistics. Ph.D. qualifying examination, 2004
42. Li, Wenyu, Mechanical Engineering. Ph.D. qualifying examination, 2017
43. Loscutoff, Peter, Physics. Ph.D. qualifying examination, 2011; dissertation committee, “Search for resonant $WZ \rightarrow \ell\nu\ell\ell$ production using $13fb^{-1}$ in $\sqrt{s} = 8TeV$ pp collisions with the ATLAS detector,” 2013
44. Luen, Bradley, Statistics. Ph.D. qualifying examination, 2006; Chair, dissertation committee, “Earthquake Prediction: Simple Methods for Complex Phenomena,” 2010
45. Luo, Tian, Statistics. MA thesis chair, “Nonparametric estimation of business survival with an application to restaurant startups,” 2014
46. Madar, Vered, Statistics and Operations Research, Tel Aviv University. MA thesis committee, “Non-equivariant confidence intervals,” 2002; Ph.D. committee, “Simultaneous Confidence Intervals for Multiple Parameters with More Power to Determine the Sign,” 2007
47. Maurer, Tessa, Civil and Environmental Engineering. Ph.D. qualifying examination, 2018
48. Megnin, Charles Henri, Geophysics. Ph.D. qualifying examination, 1996; dissertation committee, “The Shear Velocity Structure of the Mantle from the Inversion of Time-Domain Waveform Data,” 1999
49. Mieler, Michael William, Civil Engineering. Ph.D. qualifying examination, 2011
50. Millman, Kenneth Jarrod, Biostatistics. MA thesis committee, “permute—a Python package for permutation tests and confidence sets,” 2015

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51. Miratrix, Luke W., Statistics. Chair, Ph.D. qualifying examination, 2010
52. Mohanty, Sudatta, Civil Engineering. Ph.D. qualifying examination, 2017
53. Murmann, Boris, EECS. Ph.D. qualifying examination, 2002; dissertation committee, "Digital Calibration for Low-Power High-Performance A/D Conversion," 2003
54. Oreluk, James, Mechanical Engineering. Ph.D. qualifying examination, 2017
55. Ottoboni, Kellie, Statistics. Ph.D. qualifying examination, 2017
56. Ou, Jeffrey Jiajiunn, EECS. Ph.D. qualifying examination, 1995
57. Petkov, Vladimir Plamenov, EECS. Ph.D. qualifying examination, 2003
58. Poobuapheun, Nuntachai, EECS. Ph.D. qualifying examination, 2005; dissertation committee, "LNA and Mixer Designs for Multi-Band Receiver Front-Ends," 2009
59. Puente, Suzette, Statistics. M.A. committee, 2013
60. Pulliam, R. Jay, Geophysics. Ph.D. dissertation committee, "Imaging Earth's Interior: Tomographic Inversion of Mantle P-Wave Velocity Structure," 1991
61. Qian, Kun, EECS. Ph.D. qualifying examination, 2009; dissertation committee, "Variability Modeling and Statistical Parameter Extraction for CMOS Devices," 2015
62. Regier, Jeffery, Statistics. Chair, M.A. committee, 2013; dissertation committee, "Topics in large-scale statistical inference," 2016
63. Rein, Steven Richard, Statistics. Chair, Ph.D. qualifying examination, 1990
64. Rossi, Jim, Journalism. M.A. thesis committee, "Reverse-engineering the Echo Chamber," 2017

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65. Schafer, Chad Michael, Statistics. Ph.D. qualifying examination, 2001; chair, dissertation committee, "Constructing Confidence Regions of Optimal Expected Size: Theory and Application to Cosmic Microwave Inference," 2004
66. Son, Sang Won, EECS. Ph.D. qualifying examination, 2000; dissertation committee, "High Dynamic Range CMOS Mixer Design," 2002
67. Stern, Aaron James, Computational Biology. Ph.D. qualifying examination, 2017.
68. Suzuki, Toru, Demography. Ph.D. qualifying examination, 1995; dissertation committee, "Projection of Households in Japan with a Dynamic Macro-Simulation Model," 1999
69. Tee, Luns, EECS. Ph.D. qualifying examination, 2001
70. Tenorio, Luis-Francisco, Mathematics. Ph.D. dissertation committee, "Asymptotic Dynamics of Locally Oblique Solitary Wave Solutions of the KP Equation," 1992
71. Thompson, Neil, Statistics. M.A. committee, 2012
72. To, Albert Chi Fu, Statistics. M.A. committee, 2005
73. Wagner, Tim Allen, CS. Ph.D. qualifying examination, 1995; dissertation committee, "Practical Algorithms for Incremental Software Development Environments," 1997
74. Wang, Jason, Astronomy. Ph.D. qualifying examination, 2017; dissertation committee, "Footage of Other Worlds: Unveiling the Dynamical Architecture of Young Exoplanetary Systems," 2018
75. Wicks, Charles Wesley Jr., Geophysics. Ph.D. qualifying examination, 1990; dissertation committee, "An Investigation of Mantle Discontinuities Beneath the Southwest Pacific," 1994
76. Wilhelm, Matthieu, Université de Neuchâtel, Statistics. Ph.D. dissertation committee, "Random sampling with repulsion," 2017
77. Yao, Shijing, EECS. Ph.D. qualifying examination, 2015

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78. Yates, Vincent, Statistics. Chair, M.A. committee, 2012
79. Ying, Jun, Naval Architecture. D. Eng. qualifying examination, 1995; dissertation committee, “Development and Verification of Computer Simulation Models for Evaluation of Siting Strategies and Evacuation Procedures for Mobile Drilling Units in Hurricanes,” 1996
80. Zhang, Xiaoyan, Statistics. Ph.D. qualifying examination, 1997
81. Zagheni, Emilio, Demography. Ph.D. qualifying examination, 2008
82. Zamora, Joel Barajas, UC Santa Cruz, EE. Ph.D. dissertation defense, 2015; dissertation committee, “Online Display Advertising Causal Attribution and Evaluation,” 2015

First-year PhD advising

2014–15 Thanh-Nhan (Andrew) Do

2014–15 Kellie Ottoboni

2016–17 Jake Soloff

Current PhD advisees

2014– Kellie Ottoboni

2018– Amanda Glazer

Undergraduate Research and Honors Thesis Advisees

2018 Omar Buenrostro, Alan Chuang, Christopher Fan, Jin Kweon, James Li, Hubert Luo, William Ma, Jiazhong (Frank) Mei, Arun Ramamurthy, Avi Sen, Neil Sharma, Karen Tu, Zihui (Lucy) Wang, Steven Ye, Saam Zahedian, Wentao Zhan

2015 Fang Cai, Catherine Darin (U. Pennsylvania)

2014 Hriday Kemburu, He Ma, Rachel Redberg

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2010–2011 Katherine McLaughlin
 2010 Aaron Taylor, Hua Yang
 2009 Joshua M. Levin
 2008 Jonathan Ong
 2007 Gerold Ng
 2003–2004 Feng Tang
 1993–1996 Dendy Harjanto
 1988–1993 10 others

Service

Professional Societies and Government Agencies

- 2018
- Advisory Board, U.S. Election Assistance Commission
 - Consultant, Colorado Secretary of State
 - Reviewer, National Academies of Sciences, Engineering, and Medicine, Policy and Global Affairs Division
 - Editorial Board, *ScienceOpen*
 - Chair for Auditability, IEEE/NIST Voting System Standards Committee (VSSC) Working Group For Voting Methods Mathematical Models (C/VSSC/1622.X.WG)
 - Organizing Committee, Election Audit Summit, Caltech/MIT Voting Technology Project, December 2018. <https://electionlab.mit.edu/election-audit-summit>
 - Program committee, 2018 Workshop on Advances in Secure Electronic Voting Schemes (VOTING'18, held in conjunction with the 2018 Conference on Financial Cryptography and Data Security, FC'18)
 - Program committee, 2019 Workshop on Advances in Secure Electronic Voting Schemes (VOTING'19, held in conjunction with the 2019 Conference on Financial Cryptography and Data Security, FC'19)

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- Program committee, Fourth International Joint Conference on Electronic Voting (E-Vote-ID 2019)
 - Referee, *Geophysical Research Letters*
 - Referee, *Proceedings of the National Academy of Sciences*
 - Referee, *PeerJ*
- 2017
- Advisory Board, U.S. Election Assistance Commission
 - Consultant, Colorado Secretary of State
 - Founding Steering Committee and Editorial Board, USENIX Journal of Voting Technology
 - Editorial Board, *ScienceOpen*
 - Chair for Auditability, IEEE/NIST Voting System Standards Committee (VSSC) Working Group For Voting Methods Mathematical Models (C/VSSC/1622.X-WG)
 - Program committee, 2018 Workshop on Advances in Secure Electronic Voting Schemes (VOTING’18, held in conjunction with the 2018 Conference on Financial Cryptography and Data Security, FC’18)
 - Program committee, 2017 Workshop on Advances in Secure Electronic Voting Schemes (VOTING’17, held in conjunction with the 2017 Conference on Financial Cryptography and Data Security, FC’17)
 - Chair, Mini-symposium on Open Data and Reproducibility, *2017 International Scientific Computing with Python (SciPy) Conference*, Austin, TX.
 - Referee, *Proceedings of the National Academy of Sciences*
- 2016
- Advisory Board, U.S. Election Assistance Commission
 - Consultant, Colorado Secretary of State
 - Travis County Texas Elections Division STAR-Vote System Brain Trust
 - Founding Steering Committee and Editorial Board, USENIX Journal of Voting Technology

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- Associate editor, SIAM/ASA Journal of Uncertainty Quantification
 - Editorial Board, *ScienceOpen*
 - Chair for Auditability, IEEE/NIST Voting System Standards Committee (VSSC) Working Group For Voting Methods Mathematical Models (C/VSSC/1622.X.WG)
 - Program committee, 2016 Workshop on Advances in Secure Electronic Voting Schemes (VOTING'16, held in conjunction with the 2016 Conference on Financial Cryptography and Data Security, FC'16)
 - Program committee, 2017 Workshop on Advances in Secure Electronic Voting Schemes (VOTING'17, held in conjunction with the 2017 Conference on Financial Cryptography and Data Security, FC'17)
 - Program committee, 12th International Joint Conference on Electronic Voting (E-Vote-ID 2016), Bregenz, Austria
 - Session co-organizer, “Productive Ecologies in the Anthropocene: Foraging Systems,” Sixth International Conference on Food Studies, Berkeley, CA
- 2015
- Consultant, Colorado Secretary of State
 - Travis County Texas Elections Division STAR-Vote System Brain Trust
 - Founding Steering Committee and Editorial Board, USENIX Journal of Voting Technology
 - Associate editor, SIAM/ASA Journal of Uncertainty Quantification
 - Editorial Board, *ScienceOpen*
 - Chair for Auditability, IEEE/NIST Voting System Standards Committee (VSSC) Working Group For Voting Methods Mathematical Models (C/VSSC/1622.X.WG)
 - Program committee, VoteID 2015: The 5th International Conference on e-Voting and Identity, Bern, Switzerland. <http://www.voteid15.org/>

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- Program committee, 2015 European Symposium on Research in Computer Security (ESORICS 2015), Vienna, Austria. <http://esorics2015.sba-research.org/>
 - Program committee, 2016 Workshop on Advances in Secure Electronic Voting Schemes (VOTING'16, held in conjunction with the 2016 Conference on Financial Cryptography and Data Security, FC'16)
 - Session organizer, Teaching Computational Thinking and Practice, 2015 SIAM Conference on Computational Science and Engineering (CSE15)
 - Organizer, Berkeley Institute for Data Sciences and Moore/Sloan Data Science Environments 2015 Conference on Reproducibility
 - Referee, PeerJ
- 2014
- Consultant, Colorado Secretary of State
 - Travis County Texas Elections Division STAR-Vote System Brain Trust
 - Founding Steering Committee and Editorial Board, USENIX Journal of Election Technology and Systems (JETS)
 - Associate editor, SIAM/ASA Journal of Uncertainty Quantification
 - Editorial Board, *ScienceOpen*
 - Member, IEEE/NIST Voting System Standards Committee (VSSC) Working Group For Voting Methods Mathematical Models (C/VSSC/1622.X-WG)
 - Organizing committee co-chair, 2014 SIAM/ASA Conference on Uncertainty Quantification, Savannah, GA
 - Program committee, VoteID 2015: The 5th International Conference on e-Voting and Identity, Bern, Switzerland. <http://www.voteid15.org/>
 - Program committee, 2015 European Symposium on Research in Computer Security (ESORICS 2015), Vienna, Austria. <http://esorics2015.sba-research.org/>

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- Session organizer, late-breaking session on Reproducibility, 2014 Joint Statistical Meetings, Boston, MA
 - Session organizer and chair, 2014 Conference of the International Society for Nonparametric Statistics, Cadiz, Spain
 - Session organizer, Teaching Computational Thinking and Practice, 2015 SIAM Conference on Computational Science and Engineering (CSE15)
 - Referee, PLoS One
- 2013
- Consultant, California Secretary of State
 - Consultant, Colorado Secretary of State
 - Consultant, U.S. Department of Justice, Civil Division
 - Travis County Texas Elections Division STAR-Vote System Brain Trust
 - Founding Steering Committee and Editorial Board, USENIX Journal of Election Technology and Systems (JETS)
 - Associate editor, SIAM/ASA Journal of Uncertainty Quantification
 - Organizing committee co-chair, 2014 SIAM/ASA Conference on Uncertainty Quantification, Savannah, GA
 - Session organizer, Conference of the International Society for Nonparametric Statistics, Cadiz, Spain
- 2012
- Consultant, California Secretary of State
 - Consultant, Colorado Secretary of State
 - Consultant, U.S. Department of Justice
 - Travis County Texas Elections Division STAR-Vote System Brain Trust
 - Founding Steering Committee, USENIX Journal of Election Technology and Systems (JETS)
 - Reviewer, National Science Foundation
 - Program committee, 2012 Electronic Voting Technology / Workshop on Transparent Elections (EVT/WOTE '12), USENIX Security Symposium, Bellevue, WA

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- Session organizer, 2012 Joint Statistical Meetings of the American Statistical Association, International Biometric Society, and Institute of Mathematical Statistics, San Diego, CA
 - Session organizer, 1st Conference of the International Society for NonParametric Statistics, Chalkidiki, Greece
 - Organizing committee co-chair, 2014 SIAM/ASA Conference on Uncertainty Quantification, Savannah, GA
 - Program committee, 2012 SIAM/ASA/SAMSI/USACM Conference on Uncertainty Quantification, Raleigh, NC
 - Session organizer, Election Verification Network (EVN) annual conference, Santa Fe, NM
- 2011
- Consultant and Expert Witness, U.S. Department of Justice, Civil Division (for U.S. Department of Housing and Urban Development)
 - Program committee, 2012 SIAM/ASA/SAMSI/USACM Conference on Uncertainty Quantification, Raleigh, NC
 - Consultant, California Secretary of State
 - Consultant, Colorado Secretary of State
 - Session organizer, Election Verification Network (EVN) annual conference, Chicago, IL
- 2010
- Consultant and Expert Witness, U.S. Department of Justice, Civil Division (for Department of Housing and Urban Development)
 - Consultant, State of Illinois
 - Consultant, California Attorney General (for California Highway Patrol)
 - Consultant, New York State Senate
 - Reviewer, Department of Defense Strategic Environmental Research and Development Program
 - Session organizer, Election Verification Network (EVN) annual conference, Washington, DC
- 2009
- Consultant, California Secretary of State

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- 2008 – Consultant, California Secretary of State
- 2007 – California Secretary of State Post-Election Audit Standards Working Group http://www.sos.ca.gov/elections/elections_peas.htm
- 2006 – Consultant and Expert Witness, U.S. Department of Justice, Civil Division
- 2005 – Consultant, U.S. Department of Justice, Civil Division
 - Consultant, U.S. Department of Veterans Affairs Medical Center
 - Consultant, Habeas Corpus Resource Center
- 2004 – Reviewer, National Science Foundation
 - Consultant, U.S. Department of Justice, Civil Division
 - Consultant, U.S. Attorney's Office
 - Consultant, U.S. Department of Veterans Affairs Medical Center
- 2003 – Reviewer, National Science Foundation
 - Referee, National Sciences and Engineering Research Council of Canada
 - Consultant, U.S. Department of Veterans Affairs Medical Center
- 2002 – Consultant, U.S. Department of Agriculture
 - Consultant, U.S. Department of Justice, Civil Division
- 2001 – Consultant, U.S. Department of Justice, Civil Division
 - Co-organizer, Institute for Mathematics and Its Applications Annual Program *Mathematics in the Geosciences* and workshop on Inverse Problems and the Quantification of Uncertainty
- 2000 – Invited discussant, National Academy of Science Committee on National Statistics workshop on dual-system estimation for the 2000 Census
 - Consultant, U.S. Department of Justice, Civil Division
- 1998 – Witness, U.S. House of Representatives Subcommittee on the Census.

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- Panelist, National Science Foundation
- 1997 – Session organizer, International Statistical Institute and Bernoulli Society Meeting, Istanbul, Turkey
- 1996–present – Global Oscillation Network Group (GONG) Data Users Committee (Chair, 1996–1998)
- Reviewer for United States Geological Survey
- 1996–1999 – Consultant, National Security Agency
- 1995 – Institute of Mathematical Statistics Program Chair, Joint Statistical Meetings of the American Statistical Association, International Biometric Society, and Institute of Mathematical Statistics, Orlando, FL
- 1994–1996 – Consultant to Federal Trade Commission
- 1993 – Session organizer and chair, IMS/ASA/ENAR meeting, Philadelphia, PA
- Session organizer and chair, Joint Statistical Meetings of the American Statistical Association, International Biometric Society, and Institute of Mathematical Statistics, San Francisco, CA
- 1992 – Faculty sponsor, Department of Energy TRAC program
- 1990–1994 – Bernoulli Society Committee on Statistics in the Physical Sciences
- 1991–present – Reviewer for National Aeronautics and Space Administration (Space Physics Division)
- 1991 – Local organizer and session chair, Mathematical Sciences Research Institute Workshop on Statistical Methods in Imaging, Berkeley, CA
- 1989 – Session organizer and chair, Bernoulli Society Satellite Meeting, Leuven, Belgium
- 1989–present – Reviewer for National Science Foundation (Atmospheric Sciences; Infrastructure; International Programs; Mathematical Sciences; Methodology, Measurement, and Statistics; Solar-Terrestrial Program; Statistics and Probability)

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Foundations, Non-Profit Corporations, and Industry

- 2013–present – Board of Directors, Verified Voting Foundation
- 2011–2013 – Board of Advisors, Verified Voting Foundation
- 2010–2011 – Technical Advisory Board, Clear Ballot Group
- 2007 – Advisory Board, Facebar, Inc.
- 2000–2001 – Technical Advisory Board, Cogit.com
- 2000–2002 – National Advisory Board, eTextbooksOnline.com
- Technical Advisory Board, Atomic Dog Publishing

Editorial and Referee Service*Editorial Service*

- 2014–present – Faculty Review Board, Berkeley Scientific Journal
- 2013–present – Editorial Board, ScienceOpen
- 2013–present – Associate Editor, SIAM/ASA Journal on Uncertainty Quantification
- 2012–present – Founding Steering Committee and Editorial Board, USENIX Journal of Election Technology and Systems (JETS)
- 2011–present – Editor, Frontiers in Statistics and Probability (Springer)
- 2008 – Guest Editor, Inverse Problems
- 1998–1999 – Editor, Statistical Science
- 1997–2000 – Editorial Board, Inverse Problems
- 1994–1998 – Associate Editor, Journal of Geophysical Research

Referee Service

1. American Association for the Advancement of Science

*P.B. Stark: CV**January 4, 2019*

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2. American Mathematical Monthly
3. Annales Geophysicae
4. Annals of the Institute of Statistical Mathematics
5. Annals of Statistics
6. Arabian Journal for Science and Engineering
7. Astrophysical Journal
8. Bulletin of the Seismological Society of America
9. Cambridge University Press
10. Chapman-Hall
11. Computational Statistics and Data Analysis
12. Electronic Journal of Statistics
13. Geophysical Journal International
14. Geophysical Research Letters
15. Geophysics
16. Geophysical & Astrophysical Fluid Dynamics
17. HarperCollins
18. IEEE Journal on Acoustics, Speech and Signal Processing
19. IEEE Journal on Information Theory
20. Inverse Problems
21. Inverse Problems and Imaging
22. Journal of the American Statistical Association
23. Journal of Computational Physics
24. Journal of Economic Literature

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25. Journal of Geophysical Research
26. Jurimetrics
27. Nature
28. Nature Climate Change
29. PeerJ
30. Political Analysis
31. Physics of the Earth and Planetary Interiors
32. PLoS One
33. Proceedings of the National Academy of Sciences
34. Science
35. SIAM Review
36. Simon and Schuster
37. Springer-Verlag
38. Statistics, Politics, and Policy
39. Statistical Science
40. Tectonophysics

University Service

- 2018–2019
- Associate Dean, Division of Mathematical and Physical Sciences
 - UC Berkeley Signature Initiatives working group for Inclusive Intelligence
 - Advisory Board, Berkeley Institute for Data Science (BIDS)
 - Scientific Advisory Board, European Union H2020 Project Moving Towards Adaptive Governance in Complexity: Informing Nexus Security (MAGIC), Universitat Autònoma de Barcelona (Spain) and University of Bergen (Norway)

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- Faculty Advisory Committee, Berkeley Resource Center for Online Education (BRCOE)
 - Faculty Athletic Fellow
 - Program Advisory Committee, Doctor of Business Administration Program, Lincoln University
 - Member, Berkeley Science Network <http://bsn.berkeley.edu>
 - Schmidt Science Fellows Program review committee
- 2017–2018
- Associate Dean, Division of Mathematical and Physical Sciences
 - Chancellor’s Strategic Planning Committee on Enrollment Growth
 - Interdepartmental Committee on the Formation of the Division of Data Sciences
 - Director, Statistical Computing Facility
 - *Ad hoc* Data Sciences Divisional committee on undergraduate degree programs
 - Advisory Board, Berkeley Institute for Data Science (BIDS)
 - Academic Program Review Committee, Academic Senate representative, Department of Agricultural and Resource Economics
 - Scientific Advisory Board, European Union H2020 Project Moving Towards Adaptive Governance in Complexity: Informing Nexus Security (MAGIC), Universitat Autònoma de Barcelona (Spain) and University of Bergen (Norway)
 - Faculty Advisory Committee, Berkeley Resource Center for Online Education (BRCOE)
 - Faculty Advisory Committee, Athletic Study Center
 - Faculty Athletic Fellow
 - Program Advisory Committee, Doctor of Business Administration Program, Lincoln University
 - Member, Berkeley Science Network <http://bsn.berkeley.edu>
- 2016–2017
- Associate Dean, Division of Mathematical and Physical Sciences
 - Director, Statistical Computing Facility

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- Advisory Board, Berkeley Institute for Data Science (BIDS)
 - Scientific Advisory Board, European Union H2020 Project Moving Towards Adaptive Governance in Complexity: Informing Nexus Security (MAGIC), Universitat Autònoma de Barcelona (Spain) and University of Bergen (Norway)
 - Faculty Advisory Committee, Berkeley Resource Center for Online Education (BRCOE)
 - Faculty Advisory Committee, Athletic Study Center
 - Faculty Athletic Fellow
 - Program Advisory Committee, Doctor of Business Administration Program, Lincoln University
 - Member, Berkeley Science Network <http://bsn.berkeley.edu>
- 2015–2016
- Associate Dean, Division of Mathematical and Physical Sciences
 - Faculty Advisory Committee, Berkeley Resource Center for Online Education (BRCOE)
 - Faculty Advisory Committee, Athletic Study Center
 - Faculty Athletic Fellow
 - Program Advisory Committee, Doctor of Business Administration Program, Lincoln University
 - Member, Berkeley Science Network <http://bsn.berkeley.edu>
- 2014–2015
- Chair, Department of Statistics
 - Director, Statistical Computing Facility
 - Faculty Advisory Committee, Berkeley Resource Center for Online Education (BRCOE)
 - Campus Working Group on Course Curriculum and Design
 - Faculty Advisory Committee, Athletic Study Center
 - Engineering Science Advisory Committee, College of Engineering
 - Faculty Athletic Fellow
 - Program Advisory Committee, Doctor of Business Administration Program, Lincoln University

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- Member, Berkeley Science Network <http://bsn.berkeley.edu>
- 2013–2014 – Chair, Department of Statistics
- Director, Statistical Computing Facility
- Commission on the Future of the UC Berkeley Library <http://academic-senate.berkeley.edu/issues/commission-future-uc-berkeley-library>
- Charge: <http://evcp.berkeley.edu/sites/default/files/Library%20Commission%2009.21.2012.pdf>
- Final Report: <http://evcp.berkeley.edu/news/commission-future-uc-berkeley-library-report>
- Faculty Advisory Committee, Berkeley Resource Center for Online Education (BRCOE)
- Campus Working Group on Course Curriculum and Design
- Faculty Advisory Committee, Athletic Study Center
- Engineering Science Advisory Committee, College of Engineering
- Search Committee, Director of IT for College of Letters and Sciences
- Faculty Athletic Fellow
- Program Advisory Committee, Doctor of Business Administration Program, Lincoln University
- External Review Committee, Department of Applied Mathematics and Statistics, Colorado School of Mines
- Member, Berkeley Science Network <http://bsn.berkeley.edu>
- 2012–2013 – Chair, Department of Statistics
- Director, Statistical Computing Facility
- Commission on the Future of the UC Berkeley Library
- Faculty Advisory Committee, Berkeley Resource Center for Online Education (BRCOE)
- Engineering Science Advisory Committee, College of Engineering
- Faculty Athletic Fellow

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- Program Advisory Committee, Doctor of Business Administration Program, Lincoln University
 - Member, Berkeley Science Network <http://bsn.berkeley.edu>
- 2011–2012
- Acting Department Chair, Department of Statistics, July–August
 - Vice Chair, Department of Statistics
 - Academic Senate Alternate Representative to University of California Systemwide Assembly
 - Academic Senate Committee on Academic Planning and Resource Allocation (CAPRA)
 - Campus Committee on Classroom Policy and Management (CC-CPM)
 - Business Resumption Coordination Group (BRCG)
 - Faculty Athletic Fellow
 - Program Advisory Committee, Doctor of Business Administration Program, Lincoln University
- 2010–2011
- Academic Senate Committee on Academic Planning and Resource Allocation (CAPRA)
 - Campus Committee on Classroom Policy and Management (CC-CPM)
 - Course Note-Taking Taskforce (<http://campuspol.chance.berkeley.edu/policies/coursenotes.pdf>)
 - *Ad hoc* tenure/promotion committee
 - Faculty Athletic Fellow
 - Program Advisory Committee, Doctor of Business Administration Program, Lincoln University
- 2009–2010
- Academic Senate Committee on Computing and Communications (COMP)
 - Faculty Athletic Fellow
- 2008–2009
- Faculty Athletic Fellow

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- 2007–2008 – Undergraduate Student Learning Initiative Faculty Advisory Committee
- Faculty Athletic Fellow
- 2006–2007 – Faculty Athletic Fellow
- 2005–2006 – Faculty Athletic Fellow
- 2004–2005 – Chair, Educational Technology Committee
- e-Berkeley Steering Committee
- e-Berkeley Committee of Chairs
- e-Berkeley Implementation Task Force
- CourseWeb Steering Committee
- Faculty Athletic Fellow
- 2003–2004 – Chair, Educational Technology Committee
- e-Berkeley Steering Committee
- e-Berkeley Implementation Task Force
- Student Systems Policy Committee
- CourseWeb Steering Committee
- 2002–2003 – Faculty Assistant in Educational Technology (to Vice Provost for Undergraduate Education)
- Chair, Educational Technology Committee
- Provost’s Academic Council
- e-Berkeley Steering Committee
- e-Berkeley Implementation Task Force
- Campus Committee on Classroom Policy and Management (CC-CPM)
- Student Systems Policy Committee
- e-Berkeley Symposium Program Committee
- Faculty Search Committee, Graduate School of Education
- CourseWeb Steering Committee

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- 2001–2002
 - Faculty Assistant in Educational Technology (to Vice Provost for Undergraduate Education)
 - Chair, Educational Technology Committee
 - Provost’s Academic Council
 - e-Berkeley Steering Committee
 - e-Berkeley Implementation Task Force
 - Campus Committee on Classroom Policy and Management (CC-CPM)
 - Academic Senate Committee on Academic Planning and Resource Allocation (CAPRA)
 - CITRIS II Program Committee
 - TeleBEARS and BearFacts Committees (combined into Student Systems Policy Committee as of 3/2002)
 - e-Berkeley Portal Working Group
 - Faculty search committee, Graduate School of Education
- 2000–2001
 - Space Allocation and Capital Improvements (SACI)
 - Academic Senate Committee on Academic Planning and Resource Allocation (CAPRA)
 - CAPRA Subcommittee on Expanded Enrollment
 - CAPRA Subcommittee on changes to Academic Coordinator title
 - *Ad hoc* hiring/tenure committee
- 1999–2000
 - Space Allocation and Capital Improvements (SACI)
 - Academic Senate Library Committee (LIBR)
 - Academic Senate Committee on Academic Planning and Resource Allocation (CAPRA), Physical Planning Subcommittee, *ex officio* representative from Library Committee
 - Academic Effects Study Committee, Molecular Engineering Building
 - *Ad hoc* tenure/promotion committee
 - SACI subcommittee to audit space in Barrows Hall

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- 1998–1999 – Space Allocation and Capital Improvements (SACI)
 - Electronic Dissertations Project
 - Planning Space for the Physical Sciences Libraries
- 1997–1998 – *Ad hoc* tenure/promotion committee
- 1996 – Review of College of Science, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia
- 1994–1999 – University review committee for Department of Agricultural and Resource Economics, University of California, Berkeley
- 1993–1995 – Physical Sciences Division committee for Graduate Affirmative Action and Retention
 - Physical Sciences Division committee for Science and Mathematics Academic Re-Training (SMART)

Contracts and Grants

1. PI, NASA Grant NAG 5-883, “Constructing Core Fields Consistent with Geomagnetic Data and Geophysical Constraints,” 1987–1990.
2. Project Director and PI, NSF Grant DMS-8810192, “Inference in Curved-Ray Tomography: Solid Earth Structure,” 1989–1992.
3. PI, NSF Grant INT-9205103, “Long and Medium-Term Research: Inference in Seismological Investigations of Subducting Lithosphere,” 1992–1994.
4. PI, NSF Grant DMS-930006P, “Estimating the Sun’s Internal Angular Velocity from Free-Oscillation Frequency Splittings,” 1993–1994.
5. PI, NSF Presidential Young Investigator Award DMS-8957573, 1989–1995.
6. Co-I, NASA Grant NAG5-2438, “The Analysis of Cobe DMR Sky Maps,” 1993–1994. PI: J. Silk
7. PI, NASA Grant NAGW-2515, “New Methods for Inversion and Analysis of Solar Free-Oscillation Data,” 1991–1995.

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8. PI, NSF Grant DMS-9404276, “New Methods for Inference From COBE Data,” 1994–1997.
9. PI, NSF Grant AST-9504410, “Function Estimation and Inference in Helioseismology,” 1995–1998.
10. PI, LLNL/IGPP Grant 97-AP028, “Helioseismology with Solar Luminosity Constraints,” 1996–1997.
11. Co-I, NASA Grant NAG5-3941, “Development of data analysis, compression and visualization tools for large data sets in astrophysics and cosmology,” 1997–1998. PI: J. Silk
12. PI, NASA Grant NRA-96-09-OSS-034SOHO, “Modern Statistical Methods for Helioseismic Spectrum Estimation,” 1997–1998.
13. PI, NASA Grant NAG 5-3919, “Data Sampling Rate Reduction for the Oersted Satellite,” 1997–1998.
14. PI, UC Berkeley Classroom Technologies Grant, “Statistics *Statim*,” 1997–1998.
15. Co-I, NSF Grant DMS-9872979, “*KDI: Computational Challenges in Cosmology*,” 1998–2000. PI: A. Jaffe.
16. Co-I, NSF Grant IIS-98-17353, “*Re-Inventing Scholarly Information Dissemination and Use*,” 4/1/1999–3/31/2004. PI: R. Wilensky and D. Forsythe.
17. PI, Hewlett Packard Company Grant 89293, “Applied Mobile Technology Solutions in Learning Environments,” 3/19/2003–8/31/2004. Status report:
<https://www.stat.berkeley.edu/~stark/Grants/hp89293.htm>
18. PI, Hewlett Packard Company Grant 14928, “Applied Mobile Technology Solutions in Learning Environments—2004 Extension Grant,” 4/1/2004–6/30/2005.
19. PI, LLNL Grant B565605, “Uncertainty in Complex Simulations,” 4/3/2007–9/30/2007.

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20. PI, LLNL Grant B585264, "Uncertainty Quantification with Applications to Climate Modeling," 11/3/2009–9/30/2010.
21. PI, Genentech Inc. Grant 008485, "Measuring Glucose with NIR," 2/24/2010–10/31/2010.
22. Co-I, NSF Grant DUE-1060487, "S-STEM Berkeley Science Network Scholarship Program," 3/1/2011–2/28/2015. PI: M. Richards.
23. PI, State of Colorado U.S. Election Assistance Commission subaward UC01, 2010 Pre-Election Logic and Accuracy Testing and Post-Election Audit Initiative, 5/23/2011–4/23/2013.
24. PI, State of California Election Assistance Commission subaward 10I10066, Post Election Risk-Limiting Audit Pilot Program, 9/13/2011–4/23/2013.
25. PI, Bill and Melinda Gates Foundation Grant OPP1077697, "An Introductory Statistics MOOC With Field-Tested Online Assessments," 12/20/2012–7/31/2013.
26. Co-I, UC Berkeley MOOCLab Grant, "Forum Usage in Statistics MOOCs: Disentangling Correlation from Causation," 10/2013–8/2014. PI: M. Hearst.
27. Co-I, Berkeley Institute for Data Science, grant from the Gordon and Betty Moore Foundation and the Sloan Foundation. 12/2013–12/2018. PI: S. Perlmutter.
28. PI, UC Berkeley Food Institute Grant, "Reaping without Sowing: Urban Foraging, Sustainability, Nutrition, and Social Welfare," 2/2014–8/2015.
29. Co-I, NSF, DGE-1450053, "NRT-DESE Data Science for the 21st Century (DS421)," 2015–2020. PI: D. Ackerley.
30. PI, UC Berkeley Food Institute Grant, "Wild Food: Investigating and Reducing Barriers to the Consumption of Foraged Foods," 5/2015–12/2015.

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31. PI, State Street Bank and Trust Company Grant, “Industry Partners Program: Consortium for Data Analytics in Risk (CDAR); and Berkeley Institute for Data Science (BIDS) at UC Berkeley,” 2/2015–6/2018.
32. PI, Dascena subaward from NIH, “SBIR: A Computational Approach to Early Sepsis Detection,” 4/2017–6/2017.
33. PI, Peder Sather Grant, “Mainstreaming Sensitivity Analysis and Uncertainty Auditing,” 7/2017–6/2018.
34. Co-I, NSF Grant DMS-1745640, “(RTG): Advancing Machine Learning–Causality and Interpretability,” 2018–2023.

Consulting and Expert Witness Experience

Baker & McKenzie LLP, New York, NY: sampling and uncertainty quantification (client Nuclear Electric Insurance Limited, NEIL)

Bartlit Beck Herman Palenchar & Scott LLP, Denver, CO: intellectual property litigation (client Tessera)

Bingham McCutchen LLP, Los Angeles, CA: sampling in litigation

Bramson, Plutzik, Mahler & Birkhaeuser LLP, Walnut Creek, CA: consumer class action litigation

Bruce P. Brown Law, Atlanta, GA: election integrity litigation (client Donna Curling et al.)

Brinks, Hofer, Gilson & Lione, Chicago, IL: intellectual property litigation (clients R.J. Reynolds, Actavis)

Calfee, Halter & Griswold LLP, Cleveland, OH: tort litigation (client FirstEnergy Corp)

California-American Water Company: utilities regulation, census and survey data

Capital One: economic modeling and credit risk management; intellectual property litigation; credit loss forecasting

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Carey and Carey, Palo Alto, CA: equal protection, civil litigation

CIBC: economic modeling and credit risk management

Cisco Systems: predicting email spool fill

City of Santa Rosa, CA: water treatment monitoring

Cogit.com, San Francisco, CA: Technical advisory board; data mining, targeted web advertising

Constantine, Cannon, San Francisco, CA, and New York, NY: *Qui Tam* litigation (three cases)

Contra Costa County Public Defender, Richmond, CA: equal protection, due process, medical treatment for defendants found incompetent to stand trial

Council of Europe, Venice Commission, Venice, Italy: election integrity, electoral fraud

Crosby, Heafey, Roach, & May, Oakland, CA: insurance litigation (client Farmer's Insurance)

Croskery Law Offices, Cincinnati, OH: employment discrimination litigation

East Bay Municipal Utilities District, Oakland, CA: water treatment monitoring

EEG Systems Laboratory, San Francisco, CA: inverse problems for electrical activity of the brain

Emery Celli Brinckerhoff & Abady LLP, Washington, DC: election recounts (client Jill Stein)

eTextbooksOnline.com, New York, NY: National Advisory board

Farella Braun + Martel LLP, San Francisco, CA: sampling and estimation in litigation

Federal Trade Commission, San Francisco, CA: sampling in litigation

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Florida Education Association, Tallahassee, FL: teaching evaluations in academic employment decisions

Folger, Levin & Kahn, LLP, San Francisco, CA: sampling and risk management in litigation (client California Self-Insurers' Security Fund)

Fried, Frank, Harris, Shriver & Jacobsen LLP, New York, NY: sampling and estimation in securities litigation (clients Citigroup Global Markets Inc.; Goldman, Sachs & Co.; UBS Securities LLC)

Fuller-Austin Joint Defense Group: modeling in litigation

Georgia Department of Law, Atlanta, GA: lottery winnings (client Georgia Lottery Corporation)

Gibson, Dunn & Crutcher, New York, NY: sampling and estimation in litigation (client AIG / Lavastone Capital)

GMAC Financial Services: economic modeling and credit risk management

Habeas Corpus Resource Center, San Francisco, CA: bias in jury selection

Howard, Rice, Nemerovski, Canady, Falk, & Rabkin, San Francisco, CA: sampling in litigation; inference from retail sales data (clients K-Mart Corp., R.J. Reynolds)

Howrey LLP, East Palo Alto, CA: sampling in litigation (client Apple Inc.)

HSBC: economic modeling and credit risk management

Jones Day, Columbus, OH: sampling and estimation in litigation (client Cardinal Health)

Kaiser Permanente Northern California, Redwood City, CA: clinical trials in oncology

Kelley Jasons McGuire & Spinelli, LLP: insurance litigation (client St. Paul Fire & Marine Insurance Company)

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Keller Grover LLP, San Francisco, CA: *Qui Tam* litigation

Kemnitzer, Barron & Krieg, LLP, San Francisco, CA: sampling in consumer class action litigation

Kipling Law Group, Seattle, WA: sampling in litigation (client AT&T Wireless)

KLA Instruments Corporation, San Jose, CA: calibration of algorithms to detect IC mask flaws

Kramer, Levin, Naftalis, & Frankel, New York, NY: sampling in litigation

Latham & Watkins, LLP, Menlo Park, CA, and San Francisco, CA: sampling in consumer class action litigation (clients Apple Inc., Silver Spring Networks)

Law Offices of Gorman & Miller, San Jose, CA: trade secret litigation

Law Offices of Ilson W. New, San Francisco, CA: natural resource legislation (client California Abalone Association)

Law Offices of Ramirez, Tollner, Stebbins, Bahrnick, & Sasseen, San Jose, CA: trade secret litigation

Law Offices of Welebir & McCune, Woodside, CA: product liability litigation

Law Offices of Wells, Pinckney & McHugh, Austin, TX: employment discrimination arbitration

Law Offices of Wolkin & Timpane, San Francisco, CA: insurance litigation (client CIGNA)

Law Offices of Scott K. Zimmerman, Brentwood, CA: product liability litigation

Life Chiropractic College West, Hayward, CA: experimental design

Littler Mendelson, P.C., Dallas, TX, Los Angeles, CA, and San Francisco, CA: sampling in employment wage and hour class action litigation

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Los Angeles Superior Court, Central District: sampling in employment wage and hour litigation

Manatt, Phelps & Phillips LLP, San Francisco, CA: utilities regulation (client California-American Water Company)

Mayer, Brown, Rowe & Maw, Chicago, IL: intellectual property litigation (client Capital One)

Mayer Brown LLP, New York, NY: mortgage-backed securities litigation (clients Bank of New York Mellon, Citibank N.A.)

Memorial University Faculty Association (MUNFA), St. Johns, NL, Canada: teaching evaluations in academic employment decisions

Meyers Nave, Oakland, CA: election dispute litigation (client Novato Sanitary District)

Monaghan Safar Ducham PLLC, Burlington, VT: employment discrimination

Morgan, Lewis & Bockius LLP, Los Angeles, CA: sampling in litigation

Morrison & Foerster, San Francisco, CA: product liability class action litigation, causal inference in litigation (clients American Cemwood, Iovate Health Sciences)

Munger, Tolles & Olson, LLP, San Francisco, CA and Los Angeles, CA: consumer class action litigation, intellectual property litigation, sampling (clients Verizon Wireless, Philip Morris, Tessera)

Murphy & McGonigle, Washington, DC: risk management and credit loss forecasting (client Capital One)

National Security Agency: adaptive filtering, combining expert opinions, digital communications, information retrieval, estimation

National Solar Observatory, Tucson, AZ: spectrum estimation

Albert A. Natoli, P.C., New York, NY: surveys in consumer class action litigation

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Nichols Kaster PLLP, Minneapolis, MN: sampling and damage estimation in consumer class action litigation

Norton Rose Fulbright US LLP, Houston, TX: construction defect litigation (client M.J. Dean Construction, Inc.)

Nossaman LLP, San Francisco, CA: utilities regulation (client California-American Water Company)

Office of the Attorney General, State of California, Oakland, CA: sampling in litigation (client California Highway Patrol)

Ontario Confederation of University Faculty Associations (OCUFA) and Ryerson Faculty Association, Toronto, ON: teaching evaluations in academic employment decisions

Oracle: sampling and risk analysis

Orrick, Herrington & Sutcliffe LLP, Los Angeles and Sacramento, CA: sampling in litigation

Pacific Gas & Electric Co., San Francisco, CA: statistics and causal inference in litigation

Paul, Hastings, Janofsky & Walker LLP, Washington, DC: intellectual property litigation (client Capital One)

Phillips & Cohen LLP, San Francisco, CA: statistical inference in *Qui Tam* litigation

Porter & Hedges, LLP, Houston, TX: sampling in litigation

Schlumberger-Doll Research, Ridgefield, CT: inverse problems, signal processing

Robins Kaplan LLP: *Qui Tam* litigation

Shearman & Sterling, Washington, DC: survival analysis in litigation

Skadden, Arps, Slate, Meagher & Flom LLP, San Francisco, CA: case-control studies in litigation

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Spector Roseman Kodroff & Willis, P.C., Philadelphia, PA: *Qui Tam* litigation

Spriggs & Hollingsworth, Washington, DC: environmental litigation

State of Illinois, Monroe County State's Attorney, Waterloo, IL: evidence in capital prosecution

St. Paul Fire and Marine Insurance Company, Baltimore, MD: projecting tort liability

Susman Godfrey, LLP, Los Angeles, CA

Travis County, TX: design of auditable voting systems

United Faculty of Florida, Tallahassee, FL: teaching evaluations in academic employment decisions

U.S. Attorney's Office, Northern District of California: ethnic bias in grand jury selection

U.S. Department of Agriculture, Washington, D.C.: fairness in lending, import restrictions and risk assessment

U.S. Department of Commerce, Bureau of the Census, Washington, D.C.: estimation and modeling

U.S. Department of Housing and Urban Development, Washington, D.C.: disparate impact of hurricane Katrina relief program

U.S. Department of Justice, Civil Division, Federal Programs Branch, Washington, D.C.: sampling the Internet and testing Internet content filters; USDA import restrictions on cattle and beef; disparate racial impact in HUD disaster relief; fairness in lending; prevalence of "sexting" among young adults

U.S. Department of Veterans Affairs Medical Center, Martinez, CA: speech and non-speech hearing segregation in aging

U.S. House of Representatives, Washington, D.C.: sampling to adjust the U.S. Census

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Weintraub Genshlea Chediak Law Corporation, Sacramento, CA: wage and hour class action litigation (client Tai Wah, Inc.)

Wiegel Law Group, San Francisco, CA: sampling in class action litigation (client Trinity Management Services)

Willoughby, Stuart & Bening, San Jose, CA: insurance litigation

Winston & Strawn LLP, Chicago, IL: consumer class action litigation

Zimmerman Reed, Scottsdale, AZ: consumer class action litigation

Testimony (incomplete prior to 2003)

47. **December 2018.** Phoenix Light SF Ltd., in its own right and the right of Blue Heron Funding V Ltd., Blue Heron Funding VI Ltd., Blue Heron Funding VII Ltd., Kleros Preferred Funding V PLC, Silver Elms CDO PLC, Silver Elms CDO II Ltd., C-BASS CBO XVII Ltd., C-BASS CBO XIV Ltd. and each of Blue Heron Funding V Ltd., Blue Heron Funding VI Ltd., Blue Heron Funding VII Ltd., Kleros Preferred Funding V PLC, Silver Elms CDO PLC, Silver Elms CDO II Ltd., C-BASS CBO XVII Ltd. and C-BASS CBO XIV Ltd., in their own right, *vs.* The Bank of New York Mellon, Case 14-cv-10104 (VEC) Deposition.
46. **November 2018.** United States of America and State of New York, *ex rel.* Edward Lacey, *vs.* Visiting Nurse Service of New York. (U.S. District Court, Southern District of New York, Case 14-CV-5739 (AJN)) Deposition.
45. **August 2018.** Delores James *vs.* University of Florida (Grievances # 0817-00108 and 1117-00109) Arbitration.
44. **July 2018.** Testimony to the State of California Little Hoover Commission. Video: <http://www.lhc.ca.gov/report/voting-equipment-security>. Written testimony : <https://www.stat.berkeley>

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[.edu/~stark/Preprints/lhs18.pdf](#)

43. **July 2018.** United States of America, *ex rel.* Stephen A. Krahling and Joan A. Wlochowski, *vs.* Merck & Co., Inc. (U.S. District Court, Eastern District of Pennsylvania, Case 10-4374 (CDJ)) and *In Re:* Merck Mumps Vaccine Antitrust Litigation (Master File No. 12-3555 (CDJ)) Deposition.
42. **April 2018.** Ryerson University *vs.* The Ryerson Faculty Association re FCS & Related Issues (2018 CanLII 58446) Arbitration.
41. **August 2017.** Application of California-American Water Company (U210W) for Authorization to Modify Conservation and Rationing Rules, Rate Design, and Other Related Issues for the Monterey District (Public Utility Commission of the State of California, Application 15-07-019) Hearing.
40. **July 2017.** United States, the States of California, Delaware, Florida, Illinois, Indiana, Nevada, New Mexico, New York, and Tennessee, the Commonwealths Of Massachusetts and Virginia, and The District Of Columbia, *ex rel.* John Hendrix, *vs.* J-M Manufacturing Company, Inc., d/b/a JM Eagle, a Delaware corporation, and Formosa Plastics Corporation, U.S.A., a Delaware corporation (U.S. District Court, Central District of California, Case ED CV 06-00055-GW) Deposition.
39. **March 2017.** The People of the State of California *vs.* Keegan Lee Czirban, Richard Allen, Filoberto Pablo Alvidrez, Jaqwayne Bryant, Dale Gabriel Burnell, Juan Pablo Cardona aka Juan Luna-Cardona, Miguel Colina, Emmanuel Cordova, Ramon Duenas, Connie Renee Fields, Anisa Sakari Fortenberry, Louie Frank Gamboa, Cynthia Marie Harrell, Briana Hawkins, Jeremiah James Johnson, Kieth Carl Knutson, Mark Alex Mallory, Brian McMahon, David Moore, Marquise Lamar Owens, Mitkayem Dean Robinson, Patrice Sanders, and Seth Rui Sears. (Superior Court of the State of California, County

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of Contra Costa, 05-151662-4 and associated cases) Trial.

38. **March 2017.** Kelly Brunarski and Yvette Harmon *vs.* Miami University. (U.S. District Court, Southern District of Ohio, Western Division, 1:16-cv-0311) Deposition.
37. **January 2017.** The Western and Southern Life Insurance Company, et al. *vs.* The Bank of New York Mellon. (Court Of Common Pleas, Hamilton County, Ohio, A1302490) Trial.
36. **December 2016.** Fixed Income Shares: Series M, Lvs II LLC, PCM Fund, Inc., PIMCO Absolute Return Strategy II Master Fund LDC, PIMCO Absolutereturnstrategy III Master Fund LDC, PIMCO Absolute Return Strategy III Overlay Master Fund Ltd., PIMCO Absolute Return Strategy IV Master Fund LDC, PIMCO Absolute Return Strategy V Master Fund LDC, PIMCO Bermuda Trust: PIMCO Bermuda Foreign Low Duration Fund, PIMCO Bermuda Trust: PIMCO Bermuda U.S. Low Duration Fund, PIMCO Cayman Spc Limited, PIMCO Cayman Japan Coreplus Segregated Portfolio, PIMCO Cayman Trust: PIMCO Cayman Global Advantage Bond Fund, PIMCO Cayman Trust: PIMCO Cayman Global Aggregate Ex-Japan (Yen-Hedged) Bond Fund II, PIMCO Cayman Trust: PIMCO Cayman Global Aggregate Exjapan (Yen-Hedged) Income Fund, PIMCO Cayman Trust: PIMCO Cayman Global Aggregate Ex-Japan Bond Fund, PIMCO Cayman Trust: PIMCO Cayman Global Bond (Nzdhedged) Fund, PIMCO Dynamic Credit Income Fund, PIMCO ETF Trust, PIMCO Total Return Active Exchange-Traded Fund, PIMCO Funds: Global Investors Series PLC, Diversified Income Fund, PIMCO Funds: Global Investors Series PLC, Global Bond Fund, PIMCO Funds: Global Investors Series PLC, Global Investment Grade Credit Fund, PIMCO Funds: Global Investors Series PLC, Income Fund, PIMCO Funds: Global Investors Series PLC, PIMCO Credit Absolute Return Fund, PIMCO Funds: Global Investors Series PLC, Unconstrained Bond Fund, PIMCO Funds: PIMCO Commodities Plus Strategy Fund, PIMCO Funds: PIMCO Commodity Real Return Strategy Fund, PIMCO Funds: PIMCO Credit Absolute Return

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Fund, PIMCO Funds: PIMCO Diversified Income Fund, PIMCO Funds: PIMCO Floating Income Fund, PIMCO Funds: PIMCO Foreign Bond Fund (Unhedged), PIMCO Funds: PIMCO Global Advantage Strategy Bond Fund, PIMCO Funds: PIMCO Global Bond Fund (Unhedged), PIMCO Funds: PIMCO Income Fund, PIMCO Funds: PIMCO International Stocksplus AR Strategy Fund (U.S. Dollarhedged), PIMCO Funds: PIMCO Investment Grade Corporate Bond Fund, PIMCO Funds: PIMCO Low Duration Fund, PIMCO Funds: PIMCO Low Duration Fund II, PIMCO Funds: PIMCO Low Duration Fund III, PIMCO Funds: PIMCO Real Return Fund, PIMCO Funds: PIMCO Short-Term Fund, PIMCO Funds: PIMCO Total Return Fund, PIMCO Funds: PIMCO Unconstrained Bond Fund, PIMCO Funds: PIMCO Worldwide Fundamental Advantage AR Strategy Fund, PIMCO Funds, Private Account Portfolio Series Emerging Markets Portfolio, PIMCO Funds: Private Account Portfolio Series International Portfolio, PIMCO Funds: Private Account Portfolio Series Mortgage Portfolio, PIMCO Funds: Private Account Portfolio Series Short-Term Portfolio, PIMCO Funds: Private Account Portfolio Series U.S. Government Sector Portfolio, PIMCO Multi-Sector Strategy Fund Ltd., PIMCO Offshore Funds - PIMCO Absolute Return Strategy IV Efund, PIMCO Variable Insurance Trust: PIMCO Global Advantage Strategy Bond Portfolio, PIMCO Variable Insurance Trust: PIMCO Global Bond Portfolio (Unhedged), PIMCO Variable Insurance Trust: PIMCO Low Duration Portfolio, CREF Bond Market Account, CREF Social Choice Account, TIAA Global Public Investments, MBS LLC, TIAA-CREF Bond Fund, TIAA-CREF Bond Plus Fund, TIAA-CREF Life Insurance Company, Prudential Bank & Trust, FSB, Prudential Retirement Insurance and Annuity Company, The Gibraltar Life Insurance Company, Ltd., The Prudential Series Fund, LIICA RE II, Inc., Monumental Life Insurance Company Modified Separate Account, Transamerica Life Insurance Company, Transamerica Premier Life Insurance Company, Kore Advisors LP, and Sealink Funding Limited *vs.* Citibank N.A. (U.S. District Court, Southern District of New York, 14-cv-09373-JMF) Deposition.

35. **November 2016.** Jill Stein, Petitioner, *vs.* Wisconsin Elections

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Commission and Members of the Wisconsin Elections Commission, each and only in his or her official capacity: Mark L. Thomsen, Ann S. Jacobs, Beverly Gill, Julie M. Glancey, Steve King, and Don M. Millis, Respondents. (State of Wisconsin Circuit Court, Dane County, Judge Valerie Bailey-Rihn) Trial.

34. **October 2016.** Citizens Oversight, Inc., a Delaware non-profit corporation; and Raymond Lutz, an individual, *vs.* Michael Vu, San Diego Registrar of Voters; Helen N. Robbins-Meyer, San Diego County Chief Administrative Officer; County of San Diego, a public entity; and Does 10–10, Defendants. (Superior Court of California, County of San Diego–Central Division, 37-2016-00020273-CL-MC-CTL) Trial.
33. **July 2016.** Loc Vu-Quoc *vs.* University of Florida. (American Arbitration Association Case no. 01-15-0006-1052). Arbitration.
32. **July 2016.** Memorial University of Newfoundland Faculty Association *vs.* Memorial University of Newfoundland (Arbitration I15-07) Arbitration.
31. **June 2016.** Gasia Thomas, et al., *vs.* First Energy Corporation, et al. (Court Of Common Pleas, Cuyahoga County, Ohio, 13-CV-798520) Deposition.
30. **May 2016.** The Western and Southern Life Insurance Company, et al., *vs.* The Bank of New York Mellon. (Court Of Common Pleas, Hamilton County, Ohio, A1302490) Deposition.
29. **February 2016.** Palms Place, LLC, a Nevada limited liability company, *vs.* Kittrell Garlock & Associates, Architects, AIA, LTD. d/b/a KGA Architecture, a Nevada professional corporation; M.J. Dean Construction, LLC, a Nevada limited liability company; Does I through X; Roe Corporations I through X; and Roe LLC I through X, Defendants.

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M.J. Dean Construction, Inc., a Nevada corporation, Counterclaimant, *vs.* Palms Place, LLC, a Nevada limited liability company, Does I-X, Roe Corporations I-X, Boe Bonding Companies I-X, Loe Lenders I-X and Toe Tenants I-X, Counterdefendants.

Kittrell Garlock & Associates, Architects, AIA, Ltd. d/b/a KGA Architecture, a Nevada professional corporation, Counterclaimant, *vs.* Palms Place, LLC, a Nevada limited liability company, and Toes I-XV, Counterdefendants.

M.J. Dean Construction, Inc., a Nevada corporation, Third-Party Plaintiff, *vs.* Embassy Glass, Inc., a Nevada corporation; Zetian Systems, Inc., a Nevada corporation; Bombard Mechanical, LLC, a Limited Liability Company; Century Steel, Inc., a Nevada corporation; Pacific Custom Pools, Inc., a Nevada corporation; Superior Tile & Mechanical, Inc., a Nevada corporation; Mesa Mechanical, LLC, a Limited Liability Company; Dean Roofing Co., a Nevada Corporation; Does 1 through 50; Roe Corporations 1 through 50, Third-Party Defendants.

Palms Place, LLC, a Nevada limited liability company, Cross-Claimant, *vs.* Embassy Glass, Inc., a Nevada corporation; Zetian Systems, Inc., a Nevada corporation; Does 1 through 50; Roe Corporations 1 through 50, Cross-Defendants. (Nevada District Court, Clark County, Nevada, A-11-645150-C) Deposition.

28. **September 2015.** Lavastone Capitol LLC *vs.* Coventry First LLC, LST I LLC, LST II LLC, LST Holdings LTD., Montgomery Capital, Inc., Alan Buerger, Reid Buerger, Constance Buerger, and Krista Lake. (U.S. District Court, Southern District of New York, 14-CV-07139 JSR) Trial.
27. **May 2015.** Lavastone Capitol LLC *vs.* Coventry First LLC, LST I LLC, LST II LLC, LST Holdings LTD., Montgomery Capital, Inc., Alan Buerger, Reid Buerger, Constance Buerger, and Krista Lake. (U.S. District Court, Southern District of New York, 14-CV-07139 JSR) Deposition.

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26. **April 2015.** Testimony before the California State Assembly Committee on Elections and Redistricting. Legislative hearing. <https://www.stat.berkeley.edu/~stark/Preprints/ab44-assembly-2015-4-15.htm>
25. **July 2014.** New Jersey Carpenters Health Fund, New Jersey Carpenters Vacation Fund, and Boilermaker Blacksmith National Pension Trust, on Behalf of Themselves and All Others Similarly Situated, *vs.* Residential Capital, LLC; Residential Funding, LLC; Residential Accredited Loans, Inc.; Bruce J. Paradis; Kenneth M. Duncan; Davee L. Olson; Ralph T. Flees; Lisa R. Lundsten; James G. Jones; David M. Bricker; James N. Young; Residential Funding Securities Corporation d/b/a GMAC RFC Securities; Goldman, Sachs & Co.; RBS Securities, Inc. f/k/a Greenwich Capital Markets, Inc. d/b/a RBS Greenwich Capital; Deutsche Bank Securities, Inc.; Citigroup Global Markets, Inc.; Credit Suisse Securities (USA) LLC; Bank of America Corporation as successor-in-interest to Merrill Lynch, Pierce, Fenner & Smith, Inc.; UBS Securities LLC; JPMorgan Chase & Co., Inc. as successor-in-interest to Bear, Stearns & Co., Inc.; and Morgan Stanley & Co., Inc. (U.S. District Court, Southern District of New York, Case 08-CV-8781 HB) Deposition.
24. **October 2013.** United States, the States of California, Delaware, Florida, Illinois, Indiana, Nevada, New Mexico, New York, and Tennessee, the Commonwealths Of Massachusetts and Virginia, and The District Of Columbia Ex Rel. John Hendrix, Plaintiffs, *vs.* J-M Manufacturing Company, Inc., d/b/a JM Eagle, a Delaware corporation, and Formosa Plastics Corporation, U.S.A., a Delaware corporation (U.S. District Court, Central District of California, Case ED CV 06-00055-GW) Trial.
23. **September 2013.** Tessera, Inc. *vs.* Advanced Micro Devices, Inc., a Delaware corporation; Spansion, LLC, a Delaware limited liability corporation; Spansion, Inc., a Delaware corporation; Spansion Technology, Inc., a Delaware corporation; Advanced Semiconductor Engineering, Inc., a Republic of China corporation; ASE (U.S.), Inc., a California

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corporation; ChipMOS Technologies, Inc., a Republic of China corporation; ChipMOS U.S.A., Inc., a California corporation; Siliconware Precision Industries Co., Ltd., a Republic of China corporation; Siliconware USA, Inc., a California corporation; STMicroelectronics N.V., a Netherlands corporation; STMicroelectronics, Inc., a Delaware corporation; STATS ChipPAC, Inc., a Delaware corporation; STATS ChipPAC (BVI), Inc., a British Virgin Islands company; STATS ChipPAC, Ltd., a Singapore company (U.S. District Court, Northern District of California, Case C 05-04063 CW) Deposition.

22. **July 2013.** United States, the States Of California, Delaware, Florida, Illinois, Indiana, Nevada, New Mexico, New York, and Tennessee, the Commonwealths Of Massachusetts And Virginia, and The District Of Columbia Ex Rel. John Hendrix, Plaintiffs, *vs.* J-M Manufacturing Company, Inc., d/b/a JM Eagle, a Delaware corporation, and Formosa Plastics Corporation, U.S.A., a Delaware corporation (U.S. District Court, Central District of California, Case ED CV 06-00055-GW) Deposition.
21. **June 2013.** Free Speech Coalition, Inc., American Society Of Media Photographers, Inc.; Michael Barone; David Conners a/k/a Dave Cummings; Thomas Hymes; Townsend Enterprises, Inc. d/b/a Sinclair Institute; C1R Distribution, LLC d/b/a Channel 1 Releasing; Barbara Alper; Carol Queen; Barbara Nitke; David Steinberg; Marie L. Levine a/k/a Nina Hartley; Dave Levingston; Betty Dodson; Carlin Ross *vs.* Eric H. Holder, Jr., Attorney General of the United States (U.S. District Court, Eastern District of Pennsylvania, Case 2:09-4607 MMB) Trial.
20. **October 2011.** Jonathan Buckheit *vs.* Tony Dennis, Dean Devlugt, Town of Atherton, County of San Mateo, Anthony Kockler and Jerry Carlson (U.S. District Court, Northern District of California, Case CV09-5000 JCS) Deposition.
19. **June 2010.** Testimony before California State Senate Committee

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on Elections, Reapportionment and Constitutional Amendments. Legislative hearing. <https://www.stat.berkeley.edu/~stark/Preprints/ab2023-senate-15-6-10.htm>

18. **April 2010.** Testimony before California State Assembly Committee on Elections and Redistricting. Legislative hearing. <https://www.stat.berkeley.edu/~stark/Preprints/ab2023-assembly-20-4-10.htm>
17. **March 2010.** Suzan Sharpley and Robert Abeling *vs.* William Long; Novato Sanitary District; Elaine Ginnold, Marin County Registrar of Voters; Does 1–10. (State of California Superior Court, County of Marin, Case CIV 096368) Trial.
16. **January 2010.** Kastanos et al. *vs.* Central Concrete Supply Co., Inc. (State of California Superior Court, County of Alameda, Lead Case No. HG 07-319366) Trial.
15. **June 2009.** Star Scientific, Inc., *vs.* R.J. Reynolds Tobacco Company, et al. (U.S. District Court, Maryland District, Northern Division, Case Nos. MJG-01 1504 and MJG-02 2504) Trial.
14. **May 2009.** Star Scientific, Inc., *vs.* R.J. Reynolds Tobacco Company, et al. (U.S. District Court, Maryland District, Northern Division, Case Nos. MJG-01 1504 and MJG-02 2504) Deposition.
13. **July 2008.** Coordination Proceeding Special Title (Rule 1550(b)) Cellphone Termination Fee Cases (State of California Superior Court, County of Alameda, Case 4332) Deposition.
12. **April 2008.** Coordination Proceeding Special Title (Rule 1550(b)) Cellphone Termination Fee Cases (State of California Superior Court,

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County of Alameda, Case 4332) Deposition.

11. **August 2007.** Self-Insurers' Security Fund *vs.* Gallagher Bassett Services, Inc. (U.S. District Court, Northern District of California, Case No. C 06-02828 JSW) Deposition.
10. **March 2007.** Peter Wachtell *vs.* Capital One Financial Corporation and Capital One Services, Inc. (U.S. District Court, District of Idaho, Case No. CIV03-267-S-MHW) Deposition.
9. **November 2006.** Coordination Proceeding Special Title (Rule 1550(b)) Cellphone Termination Fee Cases (State of California Superior Court, County of Alameda, Case 4332) Deposition.
8. **November 2006.** ACLU *vs.* Gonzales (U.S. District Court, Eastern District of Pennsylvania, Civil Action No. 98-5591) Trial.
7. **August 2006.** ACLU *vs.* Gonzales (U.S. District Court, Eastern District of Pennsylvania, Civil Action No. 98-5591) Deposition.
6. **December 2004.** Star Scientific, Inc., *vs.* R.J. Reynolds Tobacco Company, et al. (U.S. District Court, Maryland District, Northern Division, Case Nos. MJG-01 1504 and MJG-02 2504) Trial.
5. **December 2003.** Richison et al. *vs.* American Cemwood Corporation (State of California Superior Court, San Joaquin County, Case No. 005532) Trial.
4. **December 2003.** Pacific Gas and Electric Co. *vs.* City and County of San Francisco (U.S. District Court, Northern District of California, Case No. C99-2071 VRW) Deposition.

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3. **May 2003.** Richison et al. *vs.* American Cemwood Corporation (State of California Superior Court, San Joaquin County, Case No. 005532) Deposition.
2. **May 1998.** Testimony before the U.S. House of Representatives Subcommittee on the Census. Legislative hearing.
1. **1997.** Testimony before the State of California Senate Committee on Natural Resources. Legislative hearing.

<https://www.stat.berkeley.edu/~stark/bio.pdf>

Last modified January 4, 2019.

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II

Pre-processing Georgia XML Election Data

```
In [1]: %matplotlib inline
import math
import numpy as np
import scipy as sp
import scipy.optimize
from scipy.stats import hypergeom, binom, norm
from scipy import special
from cryptorandom.cryptorandom import SHA256
from cryptorandom import sample
from permute.utils import binom_conf_interval
import matplotlib.pyplot as plt
import pandas as pd
from lxml import etree
import csv

elec_fn = '../Data/detail.xml'
```

```
In [2]: elec = etree.parse(elec_fn)
```

```
In [3]: e_root = elec.getroot()
```

Example record:

11/9/2018 8:13:23 PM EST November 6, 2018 - General Election

11/6/2018

Richmond

```
<VoterTurnout ballotsCast="70355" totalVoters="122747" voterTurnout="57.32">
  <Precincts>
    <Precinct ballotsCast="536" name="101" percentReporting="4" totalVoters="830" voterTurnout="64.58"/>
  </Precincts>
</VoterTurnout>
```

... ..

In [4]: *# Contest key=20000 is Governor, Choice key=40 is Kemp*

```
elec.xpath("sum(Contest[@key='20000']/Choice[@key='40']//County/@votes)")
```

```
# elec.xpath("Contest[@text='Governor']/Choice[@text='BRIAN KEMP (REP)']//County/@votes")
# elec.find('//Precinct')
```

Out[4]: 1978408.0

Create a CSV file with total ballots cast in each county

Verified matching between CSV, XML, and GA website on 1/4/2019 by KO:

- totals for Appling, Atkinson, Bacon, Baker, Baldwin match
- total ballots cast statewide 3,949,905 matches

```

In [5]: totals = elec.xpath("ElectionVoterTurnout/Counties/County")

# open a file for writing

total_ballots_by_county = open('../Data/total_ballots_by_county.csv', 'w')
total = 0

# create the csv writer object

csvwriter = csv.writer(total_ballots_by_county)

csvwriter.writerow(["County", "Ballots cast"])
for v in totals:
    csvwriter.writerow([v.attrib["name"], v.attrib["ballotsCast"]])
    total += int(v.attrib["ballotsCast"])

# close the file

total_ballots_by_county.close()

# assert that the total by county, summed, equals the reported total

assert total == int(elec.xpath("ElectionVoterTurnout/@ballotsCast")[0])

```

Create a CSV file with reported votes by county by contest by candidate

Verified matching between CSV, XML, and GA website on 1/4/2019:

- Votes for Kemp in Bryan county, broken out by vote type, match in CSV and XML. The sum matches the website total 10,507.
- Votes for Geoff Duncan (Lt. Gov) in Ware county, broken out by vote type, match in CSV and XML. The sum matches the website total 7,619.

In [6]: *# open a file for writing*

```

votes = open('../Data/votes_by_candidate_county.csv', 'w')

# create the csv writer object

csvwriter = csv.writer(votes)
csvwriter.writerow(["Contest", "Candidate", "Vote type", "County", "Ballots cast"])

for contest in e_root.iter("Contest"):
    contest_name = contest.attrib["text"]
    for choice in contest.iter("Choice"):
        candidate = choice.attrib["text"]
        for votetype in choice.iter("VoteType"):
            val = votetype.attrib["name"]
            for v in votetype:
                csvwriter.writerow([contest_name, candidate, val, v.attrib["name"], v.attrib["votes"]
]])

# close the file

votes.close()

```

Create CSV file with undervotes in the down-ticket statewide contests

Undervotes are counted *relative* to the number of ballots cast in the Governor's race. (We have total voter turnout, but it isn't broken out by vote type. Ballots cast for Governor are broken out by vote type.)

Checked on 1/4/19:

- No negative undervote counts
- For each Vote Type in each County, the Total Ballots is the same for every Contest

```

In [7]: total_ballots_cast = pd.read_csv('../Data/total_ballots_by_county.csv')
        reported_votes = pd.read_csv('../Data/votes_by_candidate_county.csv')

```


In [8]: `reported_votes.head()`

Out[8]:

	Contest	Candidate	Vote type	County	Ballots cast
0	Governor	BRIAN KEMP (REP)	Election Day	Appling	2334
1	Governor	BRIAN KEMP (REP)	Election Day	Atkinson	808
2	Governor	BRIAN KEMP (REP)	Election Day	Bacon	609
3	Governor	BRIAN KEMP (REP)	Election Day	Baker	409
4	Governor	BRIAN KEMP (REP)	Election Day	Baldwin	3054

```
In [9]: statewide_contests = np.array(["Governor", "Lieutenant Governor", "Secretary Of State", \
    "Attorney General", "Commissioner Of Agriculture", \
    "Commissioner Of Insurance", "State School Superintendent", "Commissio
ner Of Labor", \
    "Public Service Commission, District 3 - Metro-Atlanta", \
    "Public Service Commission, District 5 - Western"])
reported_votes = reported_votes[reported_votes["Contest"].isin(statewide_contests)]

reported_votes_by_contest = reported_votes.groupby(["Contest", "County", "Vote type"])["Ballots cast"
].agg(np.sum)
reported_votes_by_contest = reported_votes_by_contest.reset_index()
reported_votes_by_contest.head()
```

Out[9]:

	Contest	County	Vote type	Ballots cast
0	Attorney General	Appling	Absentee by Mail	519
1	Attorney General	Appling	Advance in Person	3180
2	Attorney General	Appling	Election Day	2860
3	Attorney General	Appling	Provisional	3
4	Attorney General	Atkinson	Absentee by Mail	88

```
In [10]: gov_race = reported_votes_by_contest[reported_votes_by_contest["Contest"]=="Governor"]
gov_race = gov_race.copy()
gov_race.rename(columns={'Ballots cast': 'Total ballots'}, inplace=True)
gov_race = gov_race.drop(columns=["Contest"])
gov_race.head()
```

Out[10]:

	County	Vote type	Total ballots
2544	Appling	Absentee by Mail	530
2545	Appling	Advance in Person	3298
2546	Appling	Election Day	2978
2547	Appling	Provisional	3
2548	Atkinson	Absentee by Mail	88

```
In [11]: max_votes_estimated = reported_votes_by_contest.groupby(["County", "Vote type"]).agg(np.max)
max_votes_estimated = max_votes_estimated.drop(columns=["Contest"]).reset_index()
max_votes_estimated.rename(columns={'Ballots cast': 'Total ballots'}, inplace=True)
```

```

In [12]: merged_votes = pd.DataFrame()
        for contest in statewide_contests[1:]:
            this_race = reported_votes_by_contest["Contest"]==contest
            merged_votes_contest = pd.merge(max_votes_estimated, reported_votes_by_contest[this_race])
            merged_votes_contest["Undervotes"] = merged_votes_contest["Total ballots"] - merged_votes_contest
            ["Ballots cast"]
            merged_votes = pd.concat([merged_votes, merged_votes_contest])

merged_votes.head()

```

Out[12]:

	County	Vote type	Total ballots	Contest	Ballots cast	Undervotes
0	Appling	Absentee by Mail	530	Lieutenant Governor	523	7
1	Appling	Advance in Person	3298	Lieutenant Governor	3092	206
2	Appling	Election Day	2978	Lieutenant Governor	2768	210
3	Appling	Provisional	3	Lieutenant Governor	3	0
4	Atkinson	Absentee by Mail	88	Lieutenant Governor	88	0

```

In [13]: merged_votes.to_csv('../Data/undervotes_by_county.csv', index=False)

```

```
In [14]: # version information
%load_ext version_information
%version_information scipy, numpy, csv, pandas, matplotlib, notebook, cryptorandom, permute

Loading extensions from ~/.ipython/extensions is deprecated. We recommend managing extensions like any other Python packages, in site-packages.

/anaconda/lib/python3.6/site-packages/IPython/core/formatters.py:839: FormatterWarning: JSON expects JSONable list/dict containers, not JSON strings
  FormatterWarning)
```

Out[14]:

Software	Version
Python	3.6.7 64bit [GCC 4.2.1 Compatible Clang 4.0.1 (tags/RELEASE_401/final)]
IPython	7.2.0
OS	Darwin 18.2.0 x86_64 i386 64bit
scipy	1.1.0
numpy	1.15.4
csv	1.0
pandas	0.23.1
matplotlib	3.0.2
notebook	5.7.4
cryptorandom	0.2
permute	0.1.alpha4
Sun Jan 06 13:57:02 2019 PST	

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III

Differential undervote rate in Lt. Gov contest

Compare undervote rates by mode of voting (paper versus electronic) using hypergeometric 2-sample test.

```
In [1]: %matplotlib inline
import math
import numpy as np
import scipy as sp
import scipy.optimize
from scipy.stats import hypergeom, binom, norm, chi2
from scipy import special
from collections import Counter
from cryptorandom.cryptorandom import SHA256
from cryptorandom import sample
from permute.utils import binom_conf_interval
from permute.npc import fisher
import matplotlib.pyplot as plt
import pandas as pd
import csv
```

```

In [2]: statewide_contests = np.array(["Lieutenant Governor", "Secretary Of State", \
                                       "Attorney General", "Commissioner Of Agriculture", \
                                       "Commissioner Of Insurance", "State School Superintendent", "Commissio
ner Of Labor", \
                                       "Public Service Commission, District 3 - Metro-Atlanta", \
                                       "Public Service Commission, District 5 - Western"])
votes = pd.read_csv('../Data/undervotes_by_county.csv')
votes.head()

```

Out[2]:

	County	Vote type	Total ballots	Contest	Ballots cast	Undervotes
0	Appling	Absentee by Mail	530	Lieutenant Governor	523	7
1	Appling	Advance in Person	3298	Lieutenant Governor	3092	206
2	Appling	Election Day	2978	Lieutenant Governor	2768	210
3	Appling	Provisional	3	Lieutenant Governor	3	0
4	Atkinson	Absentee by Mail	88	Lieutenant Governor	88	0


```

In [3]: mode_mask = votes['Vote type'].isin(['Advance in Person', 'Election Day', 'Absentee by Mail'])
        dre_mask = votes['Vote type'].isin(['Advance in Person', 'Election Day'])

p_thresh = 0.0001
contests_sig = Counter()

for c in statewide_contests:
    cont_mask = votes['Contest'] == c
    for cty in votes['County'].unique():
        cty_mask = votes['County'] == cty
        N = votes[mode_mask & cont_mask & cty_mask]['Total ballots'].sum()
        G = votes[mode_mask & cont_mask & cty_mask]['Undervotes'].sum()
        g = votes[dre_mask & cont_mask & cty_mask]['Undervotes'].sum()
        n = votes[dre_mask & cont_mask & cty_mask]['Ballots cast'].sum() + g
        # pmf(k, M, n, N) = choose(n, k) * choose(M - n, N - k) / choose(M, N),
        p = 2*min(hypergeom.cdf(g, N, G, n), hypergeom.sf(g-1, N, G, n))
        if p <= p_thresh:
            contests_sig[c] = contests_sig[c]+1
    print(c, cty, N, G, n, g, G/N, g/n, p)

```

Lieutenant Governor Appling 6806 423 6276 416 0.06215104319717896 0.0662842574888464 2.1439776587662
654e-08

Lieutenant Governor Atkinson 2520 218 2432 218 0.0865079365079365 0.08963815789473684 0.000601198899
3767051

Lieutenant Governor Bacon 3829 244 3655 242 0.06372420997649517 0.06621067031463748 0.00144527105022
85972

Lieutenant Governor Baker 1291 101 1150 95 0.07823392718822618 0.08260869565217391 0.117291214017724
9

Lieutenant Governor Baldwin 15633 892 14475 882 0.05705878590161837 0.060932642487046634 6.904218122
683707e-19

Lieutenant Governor Banks 6852 220 6629 219 0.03210741389375365 0.033036657112686676 0.0105795886299
9079

Lieutenant Governor Barrow 27398 1060 26135 1049 0.03868895539820425 0.04013774631719916 3.900219802
989691e-11

Lieutenant Governor Bartow 37327 478 35759 476 0.012805743831542852 0.01331133420956962 5.3293861989
1327e-07

Lieutenant Governor Ben Hill 5533 335 5213 332 0.06054581601301283 0.06368693650489161 4.49526479982
811e-06

Lieutenant Governor Berrien 6247 320 5925 320 0.05122458780214503 0.0540084388185654 5.5789533967082
33e-08

Lieutenant Governor Bibb 60460 3049 55999 3014 0.050430036387694346 0.053822389685530096 1.963474639
7364817e-60

Lieutenant Governor Bleckley 4855 214 4598 212 0.04407826982492276 0.046107003044802086 0.0012309494
917529596

Lieutenant Governor Brantley 5689 292 5501 291 0.051327122517138335 0.052899472823123066 0.000969897
9815758128

Lieutenant Governor Brooks 5696 353 5231 344 0.061973314606741575 0.06576180462626649 1.099160869978
3508e-05

Lieutenant Governor Bryan 14970 543 14388 540 0.03627254509018036 0.03753127606338615 1.329546300843
3782e-06

Lieutenant Governor Bulloch 23543 988 22467 972 0.041965764770844835 0.04326345306449459 4.385804568
643126e-07

Lieutenant Governor Burke 8719 483 7751 480 0.05539626103910999 0.06192749322668043 3.34824474118164
02e-21

Lieutenant Governor Butts 8863 355 8483 352 0.04005415773440144 0.041494754214310973 0.0002285992830
354893

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Commissioner Of Insurance Tattnall 6639 211 6247 206 0.03178189486368429 0.032975828397630864 0.0242
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Commissioner Of Insurance Taylor 3265 94 3022 90 0.02879019908116386 0.029781601588352084 0.31796799
25306423

Commissioner Of Insurance Telfair 3631 130 3300 127 0.035802809143486644 0.03848484848484848 0.00321
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Commissioner Of Insurance Terrell 3930 116 3603 115 0.029516539440203562 0.031917846239245075 0.0008
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Commissioner Of Insurance Thomas 17241 398 16250 387 0.0230845078591729 0.023815384615384617 0.00717
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Commissioner Of Insurance Tift 13669 379 13108 369 0.027726973443558418 0.02815074763503204 0.172475
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Commissioner Of Insurance Toombs 8851 245 8170 232 0.027680488080442888 0.02839657282741738 0.183958

41994439988

Commissioner Of Insurance Towns 6132 145 5848 137 0.02364644487932159 0.023426812585499317 0.7146838
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Commissioner Of Insurance Treutlen 2610 95 2464 87 0.03639846743295019 0.03530844155844156 0.3171974
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Commissioner Of Insurance Troup 23663 480 22399 456 0.020284832861429236 0.02035805169873655 0.83700
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Commissioner Of Insurance Turner 3269 112 3121 112 0.034261241970021415 0.035885933995514256 0.01017
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Commissioner Of Insurance Twiggs 3787 119 3512 116 0.031423290203327174 0.03302961275626424 0.043907
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Commissioner Of Insurance Union 11863 245 11381 236 0.020652448790356572 0.020736314910816272 0.9198
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Commissioner Of Insurance Upson 10558 255 9956 244 0.024152301572267474 0.02450783447167537 0.412434
04148678947

Commissioner Of Insurance Walker 21451 446 20638 433 0.020791571488508694 0.02098071518558 0.3989477
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Commissioner Of Insurance Walton 38635 676 36866 652 0.017497088132522324 0.017685672435306245 0.225
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Commissioner Of Insurance Ware 11004 197 10377 189 0.017902580879680115 0.01821335646140503 0.404701
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Commissioner Of Insurance Warren 2260 76 2073 73 0.033628318584070796 0.035214664737095995 0.2248406
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Commissioner Of Insurance Washington 8159 326 7432 302 0.03995587694570413 0.040635091496232505 0.36
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Commissioner Of Insurance Wayne 10122 247 9621 242 0.02440229203714681 0.025153310466687454 0.029579
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Commissioner Of Insurance Webster 1100 40 948 37 0.03636363636363636 0.039029535864978905 0.34589408
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Commissioner Of Insurance Wheeler 1927 69 1812 69 0.03580695381421899 0.0380794701986755 0.026467157
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Commissioner Of Insurance White 11434 184 10897 179 0.016092356130837853 0.016426539414517757 0.2620
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Commissioner Of Insurance Whitfield 27302 702 26285 690 0.0257124020218299 0.026250713334601484 0.00
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Commissioner Of Insurance Wilcox 2815 87 2610 81 0.030905861456483125 0.03103448275862069 1.09976431
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Commissioner Of Insurance Worth 7831 190 7526 185 0.02426254629038437 0.024581450969970768 0.4877053
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State School Superintendent Appling 6806 195 6276 183 0.028651190126359093 0.029158699808795412 0.47
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State School Superintendent Atkinson 2520 113 2432 113 0.04484126984126984 0.046463815789473686 0.03
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State School Superintendent Bacon 3829 97 3655 95 0.025332985113606685 0.025991792065663474 0.348067
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State School Superintendent Baker 1291 57 1150 51 0.044151820294345466 0.04434782608695652 1.1354902
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State School Superintendent Banks 6852 127 6629 122 0.018534734384121423 0.018403982501131393 0.7955
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State School Superintendent Barrow 27398 464 26135 436 0.01693554274034601 0.016682609527453606 0.17
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State School Superintendent Bleckley 4855 126 4598 120 0.025952626158599383 0.02609830361026533 0.99
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 State School Superintendent Lamar 7346 142 6942 134 0.019330247753879662 0.01930279458369346 1.04898
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State School Superintendent Laurens 18939 482 17653 447 0.025450129362690744 0.02532147510338186 0.7
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 State School Superintendent Lee 13549 196 13069 190 0.014466012251826704 0.014538220215777794 0.9091
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 State School Superintendent Lowndes 35212 531 33322 491 0.015080086334204249 0.014735009903367145 0.
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State School Superintendent Paulding 61222 959 57915 901 0.015664303681683055 0.015557282223948891 0.4079777254588365
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State School Superintendent Schley 1931 53 1835 52 0.027446918694976695 0.028337874659400544 0.49731 074391743596
State School Superintendent Screven 5407 156 5136 147 0.028851488810800813 0.028621495327102803 0.76 19700449591733
State School Superintendent Seminole 3214 64 2950 58 0.019912881144990666 0.01966101694915254 0.8624 292262561878
State School Superintendent Spalding 24385 601 23102 564 0.02464629895427517 0.024413470695177908 0.3638435030940898
State School Superintendent Stephens 9069 162 8533 155 0.017863049950380416 0.018164772061408648 0.5 013622039502968
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State School Superintendent Talbot 2952 133 2667 112 0.04505420054200542 0.04199475065616798 0.029403645848459184

State School Superintendent Taliaferro 917 84 755 65 0.0916030534351145 0.08609271523178808 0.2735467300211541

State School Superintendent Tattnall 6639 192 6247 187 0.028920018075011298 0.029934368496878503 0.0512304287954861

State School Superintendent Taylor 3265 74 3022 70 0.022664624808575805 0.02316346790205162 0.689222433862807

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State School Superintendent Towns 6132 141 5848 133 0.02299412915851272 0.022742818057455542 0.6581839569738592

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Public Service Commission, District 3 - Metro-Atlanta Chattooga 7427 187 7202 184 0.0251784031237377
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Public Service Commission, District 3 - Metro-Atlanta Cherokee 106299 1964 100987 1864 0.01847618510
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Public Service Commission, District 3 - Metro-Atlanta Clarke 43261 1018 40239 959 0.0235315873419477
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Public Service Commission, District 3 - Metro-Atlanta Clay 1186 44 1043 38 0.03709949409780776 0.036
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Public Service Commission, District 3 - Metro-Atlanta Clayton 91840 1477 85993 1342 0.01608231707317
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Public Service Commission, District 3 - Metro-Atlanta Clinch 2254 90 2145 88 0.03992901508429459 0.0
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Public Service Commission, District 3 - Metro-Atlanta Cobb 310381 5372 284480 4883 0.017307760462141
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Public Service Commission, District 3 - Metro-Atlanta Coffee 12595 350 12200 343 0.02778880508138150
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Public Service Commission, District 3 - Metro-Atlanta Colquitt 12953 410 12439 402 0.031652898942329
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Public Service Commission, District 3 - Metro-Atlanta Columbia 61591 965 58655 917 0.015667873552954
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Public Service Commission, District 3 - Metro-Atlanta Cook 5803 102 5559 100 0.01757711528519731 0.0
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Public Service Commission, District 3 - Metro-Atlanta Coweta 58056 988 55244 934 0.01701805153644756
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Public Service Commission, District 3 - Metro-Atlanta Crawford 4931 116 4697 112 0.02352464003244778
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Public Service Commission, District 3 - Metro-Atlanta Crisp 7024 263 6661 252 0.03744305239179954 0.
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Public Service Commission, District 3 - Metro-Atlanta Dade 5450 204 5321 194 0.03743119266055046 0.0
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Public Service Commission, District 3 - Metro-Atlanta Dawson 11570 180 11131 177 0.01555747623163353
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Public Service Commission, District 3 - Metro-Atlanta DeKalb 310968 6618 291296 6149 0.0212819325461
1407 0.02110911238053389 0.012170672725772132

Public Service Commission, District 3 - Metro-Atlanta Decatur 9043 214 8495 201 0.023664713037708725
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Public Service Commission, District 3 - Metro-Atlanta Dodge 7051 310 6603 295 0.043965394979435544
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Public Service Commission, District 3 - Metro-Atlanta Dooly 3793 147 3597 142 0.038755602425520695
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Public Service Commission, District 3 - Metro-Atlanta Dougherty 31297 682 29353 639 0.02179122599610
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Public Service Commission, District 3 - Metro-Atlanta Douglas 55197 736 51964 686 0.0133340580103991

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 Public Service Commission, District 3 - Metro-Atlanta Early 4131 89 3658 75 0.021544420237230695 0.0
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 Public Service Commission, District 3 - Metro-Atlanta Echols 1143 31 1108 31 0.02712160979877515 0.0
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 Public Service Commission, District 3 - Metro-Atlanta Effingham 23365 402 22615 386 0.01720522148512
 7327 0.01706831748839266 0.4466408993367449
 Public Service Commission, District 3 - Metro-Atlanta Elbert 7319 195 6756 191 0.02664298401420959
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 Public Service Commission, District 3 - Metro-Atlanta Emanuel 7710 271 7320 261 0.03514915693904021
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 Public Service Commission, District 3 - Metro-Atlanta Evans 3447 124 3248 119 0.03597331012474616 0.
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 Public Service Commission, District 3 - Metro-Atlanta Fannin 11203 234 10545 222 0.02088726234044452
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 Public Service Commission, District 3 - Metro-Atlanta Fayette 57962 1068 55315 1007 0.01842586522204
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 Public Service Commission, District 3 - Metro-Atlanta Floyd 30225 654 28965 622 0.02163771712158809
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 Public Service Commission, District 3 - Metro-Atlanta Forsyth 93239 1665 88811 1551 0.01785733437724
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 Public Service Commission, District 3 - Metro-Atlanta Franklin 8149 146 7761 143 0.01791630874953982
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 Public Service Commission, District 3 - Metro-Atlanta Fulton 421806 9898 403964 9295 0.0234657638819
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 Public Service Commission, District 3 - Metro-Atlanta Gilmer 12471 308 11912 303 0.02469729773073530
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 Public Service Commission, District 3 - Metro-Atlanta Glascock 1300 60 1219 58 0.046153846153846156
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 Public Service Commission, District 3 - Metro-Atlanta Glynn 32501 672 30689 647 0.02067628688348051
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 Public Service Commission, District 3 - Metro-Atlanta Gordon 17772 441 17225 423 0.02481431465226198
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 Public Service Commission, District 3 - Metro-Atlanta Grady 8356 167 7956 157 0.019985639061752034
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 Public Service Commission, District 3 - Metro-Atlanta Habersham 15495 357 14642 339 0.02303969022265
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 Public Service Commission, District 3 - Metro-Atlanta Hall 67282 1320 63789 1257 0.01961891739246752
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Public Service Commission, District 3 - Metro-Atlanta Hancock 3539 156 3049 140 0.04408024865781294
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Public Service Commission, District 3 - Metro-Atlanta Haralson 10585 214 10192 208 0.020217288615965
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Public Service Commission, District 3 - Metro-Atlanta Harris 15972 291 15243 279 0.01821938392186326
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Public Service Commission, District 3 - Metro-Atlanta Hart 9618 266 9178 260 0.027656477438136828 0.
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Public Service Commission, District 3 - Metro-Atlanta Heard 4051 87 3773 83 0.02147617872130338 0.02
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Public Service Commission, District 3 - Metro-Atlanta Henry 98365 1470 93368 1363 0.0149443399583185
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Public Service Commission, District 3 - Metro-Atlanta Houston 59158 883 55968 816 0.0149261300246796
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Public Service Commission, District 3 - Metro-Atlanta Irwin 3556 94 3423 93 0.026434195725534307 0.0
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Public Service Commission, District 3 - Metro-Atlanta Jackson 26889 437 25870 420 0.0162519989586819
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Public Service Commission, District 3 - Metro-Atlanta Jasper 5907 105 5486 100 0.017775520568816656
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Public Service Commission, District 3 - Metro-Atlanta Jeff Davis 4815 201 4586 193 0.041744548286604
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Public Service Commission, District 3 - Metro-Atlanta Jefferson 6756 237 6149 215 0.0350799289520426
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Public Service Commission, District 3 - Metro-Atlanta Jenkins 2856 76 2668 72 0.02661064425770308 0.
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Public Service Commission, District 3 - Metro-Atlanta Johnson 3483 143 3247 130 0.0410565604364054
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Public Service Commission, District 3 - Metro-Atlanta Lamar 7346 143 6942 136 0.019466376259188675
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Public Service Commission, District 3 - Metro-Atlanta Lanier 2679 92 2571 88 0.03434117207913401 0.0
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Public Service Commission, District 3 - Metro-Atlanta Laurens 18939 530 17653 497 0.0279845820793072
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Public Service Commission, District 3 - Metro-Atlanta Lee 13549 208 13069 200 0.015351686471326297
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Public Service Commission, District 3 - Metro-Atlanta Liberty 15358 244 14408 228 0.0158874853496549
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Public Service Commission, District 3 - Metro-Atlanta Lincoln 3967 96 3617 95 0.02419964708847996 0.
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Public Service Commission, District 3 - Metro-Atlanta Long 3988 122 3819 120 0.030591775325977934 0.

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Public Service Commission, District 3 - Metro-Atlanta Lumpkin 11551 216 11084 207 0.0186996796814128
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Public Service Commission, District 3 - Metro-Atlanta Macon 4217 178 3886 166 0.042210101968223855
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Public Service Commission, District 3 - Metro-Atlanta Madison 11697 279 11170 272 0.0238522698127725
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Public Service Commission, District 3 - Metro-Atlanta Marion 2930 81 2689 77 0.02764505119453925 0.0
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Public Service Commission, District 3 - Metro-Atlanta McDuffie 8792 166 7924 154 0.01888080072793448
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Public Service Commission, District 3 - Metro-Atlanta McIntosh 5408 150 4968 139 0.02773668639053254
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Public Service Commission, District 3 - Metro-Atlanta Meriwether 8639 207 8156 199 0.023961106609561
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Public Service Commission, District 3 - Metro-Atlanta Miller 2313 114 2181 108 0.04928664072632944
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Public Service Commission, District 3 - Metro-Atlanta Mitchell 7446 164 6882 156 0.0220252484555466
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Public Service Commission, District 3 - Metro-Atlanta Monroe 12932 290 12236 285 0.02242499226724404
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Public Service Commission, District 3 - Metro-Atlanta Montgomery 3528 124 3317 119 0.035147392290249
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Public Service Commission, District 3 - Metro-Atlanta Morgan 9554 208 9144 199 0.02177098597446096
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Public Service Commission, District 3 - Metro-Atlanta Murray 11091 313 10826 301 0.02822108015508069
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Public Service Commission, District 3 - Metro-Atlanta Muscogee 63141 1165 58719 1094 0.0184507689140
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Public Service Commission, District 3 - Metro-Atlanta Newton 43129 766 40394 724 0.01776067147395024
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Public Service Commission, District 3 - Metro-Atlanta Oconee 20733 453 19802 433 0.02184922587179858
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Public Service Commission, District 3 - Metro-Atlanta Oglethorpe 6484 155 6075 149 0.023904996915484
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Public Service Commission, District 3 - Metro-Atlanta Paulding 61222 986 57915 925 0.016105321616412
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Public Service Commission, District 3 - Metro-Atlanta Peach 10355 210 9910 201 0.020280057943022695
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Public Service Commission, District 3 - Metro-Atlanta Pickens 13362 303 13140 297 0.0226762460709474
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Public Service Commission, District 3 - Metro-Atlanta Pierce 6883 122 6556 119 0.017724829289553972
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Public Service Commission, District 3 - Metro-Atlanta Pike 8534 133 8230 130 0.015584719943754394 0.
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Public Service Commission, District 3 - Metro-Atlanta Polk 12859 264 12412 259 0.020530367835757058
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Public Service Commission, District 3 - Metro-Atlanta Pulaski 3622 162 3390 150 0.0447266703478741
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Public Service Commission, District 3 - Metro-Atlanta Putnam 9321 177 8723 169 0.018989378822014805
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Public Service Commission, District 3 - Metro-Atlanta Quitman 940 54 880 45 0.0574468085106383 0.051
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Public Service Commission, District 3 - Metro-Atlanta Rabun 7578 178 6735 153 0.023489047242016364
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Public Service Commission, District 3 - Metro-Atlanta Randolph 2788 100 2475 86 0.035868005738880916
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Public Service Commission, District 3 - Metro-Atlanta Richmond 70043 1462 64729 1345 0.0208728923661
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Public Service Commission, District 3 - Metro-Atlanta Rockdale 36600 566 34747 542 0.015464480874316
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Public Service Commission, District 3 - Metro-Atlanta Schley 1931 57 1835 57 0.029518384256861728 0.
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Public Service Commission, District 3 - Metro-Atlanta Screven 5407 168 5136 163 0.03107083410393934
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Public Service Commission, District 3 - Metro-Atlanta Seminole 3214 67 2950 62 0.020846297448662104
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Public Service Commission, District 3 - Metro-Atlanta Spalding 24385 665 23102 620 0.027270863235595
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Public Service Commission, District 3 - Metro-Atlanta Stephens 9069 206 8533 191 0.02271474252949608
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Public Service Commission, District 3 - Metro-Atlanta Stewart 1784 139 1551 124 0.07791479820627803
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Public Service Commission, District 3 - Metro-Atlanta Sumter 10556 300 9679 275 0.028419856006062904
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Public Service Commission, District 3 - Metro-Atlanta Talbot 2952 146 2667 123 0.0494579945799458 0.
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Public Service Commission, District 3 - Metro-Atlanta Taliaferro 917 80 755 63 0.08724100327153762
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Public Service Commission, District 3 - Metro-Atlanta Tattnall 6639 222 6247 217 0.03343877089923181
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Public Service Commission, District 3 - Metro-Atlanta Taylor 3265 80 3022 76 0.02450229709035222 0.0
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Public Service Commission, District 3 - Metro-Atlanta Telfair 3631 144 3300 141 0.039658496282015974

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Public Service Commission, District 3 - Metro-Atlanta Terrell 3930 115 3603 114 0.029262086513994912
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Public Service Commission, District 3 - Metro-Atlanta Thomas 17241 373 16250 360 0.02163447595847108
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Public Service Commission, District 3 - Metro-Atlanta Tift 13669 366 13108 357 0.02677591630697198
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Public Service Commission, District 3 - Metro-Atlanta Toombs 8851 266 8170 245 0.03005310134448085
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Public Service Commission, District 3 - Metro-Atlanta Towns 6132 171 5848 162 0.027886497064579255
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Public Service Commission, District 3 - Metro-Atlanta Treutlen 2610 109 2464 98 0.04176245210727969
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Public Service Commission, District 3 - Metro-Atlanta Troup 23663 504 22399 473 0.021299074504500696
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Public Service Commission, District 3 - Metro-Atlanta Turner 3269 101 3121 100 0.030896298562251453
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Public Service Commission, District 3 - Metro-Atlanta Twiggs 3787 121 3512 117 0.031951412727752836
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Public Service Commission, District 3 - Metro-Atlanta Union 11863 272 11381 259 0.022928432942763213
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Public Service Commission, District 3 - Metro-Atlanta Upson 10558 220 9956 209 0.020837279787838607
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Public Service Commission, District 3 - Metro-Atlanta Walker 21451 439 20638 421 0.02046524637546035
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Public Service Commission, District 3 - Metro-Atlanta Walton 38635 689 36866 661 0.01783357059660929
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Public Service Commission, District 3 - Metro-Atlanta Ware 11004 206 10377 179 0.01872046528535078
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Public Service Commission, District 3 - Metro-Atlanta Warren 2260 81 2073 77 0.03584070796460177 0.0
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Public Service Commission, District 3 - Metro-Atlanta Washington 8159 336 7432 311 0.041181517342811
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Public Service Commission, District 3 - Metro-Atlanta Wayne 10122 274 9621 261 0.027069749061450307
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Public Service Commission, District 3 - Metro-Atlanta Webster 1100 38 948 32 0.034545454545454546 0.
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Public Service Commission, District 3 - Metro-Atlanta Wheeler 1927 46 1812 46 0.023871302542812663
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Public Service Commission, District 3 - Metro-Atlanta White 11434 189 10897 182 0.016529648417001924
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Public Service Commission, District 3 - Metro-Atlanta Whitfield 27302 641 26285 622 0.02347813347007
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Public Service Commission, District 3 - Metro-Atlanta Wilcox 2815 79 2610 74 0.028063943161634103 0.028352490421455937 0.9593432621537887

Public Service Commission, District 3 - Metro-Atlanta Wilkes 4371 146 4070 137 0.033401967513154884 0.03366093366093366 0.8886538257438112

Public Service Commission, District 3 - Metro-Atlanta Wilkinson 4264 165 3994 158 0.0386960600375234 54 0.039559339008512766 0.337104462822968

Public Service Commission, District 3 - Metro-Atlanta Worth 7831 179 7526 173 0.022857872557783168 0.022986978474621313 0.8988030857136999

Public Service Commission, District 5 - Western Appling 6806 226 6276 210 0.03320599471054952 0.0334 60803059273424 0.8054904187792586

Public Service Commission, District 5 - Western Atkinson 2520 132 2432 132 0.05238095238095238 0.054 276315789473686 0.016122961340751463

Public Service Commission, District 5 - Western Bacon 3829 118 3655 115 0.03081744580830504 0.031463 74829001368 0.4136270649993572

Public Service Commission, District 5 - Western Baker 1291 69 1150 61 0.053446940356312936 0.0530434 7826086957 0.9738962828133593

Public Service Commission, District 5 - Western Baldwin 15633 452 14475 433 0.02891319644342097 0.02 9913644214162347 0.006591322499004788

Public Service Commission, District 5 - Western Banks 6852 127 6629 124 0.018534734384121423 0.01870 568713229748 0.8047273007916005

Public Service Commission, District 5 - Western Barrow 27398 477 26135 449 0.01741002992919191 0.017 18002678400612 0.22940550742667565

Public Service Commission, District 5 - Western Bartow 37327 666 35759 646 0.017842312535162216 0.01 806538214155877 0.134702198867361

Public Service Commission, District 5 - Western Ben Hill 5533 109 5213 102 0.019699981926622086 0.01 956646844427393 0.8884472670232344

Public Service Commission, District 5 - Western Berrien 6247 148 5925 144 0.023691371858492075 0.024 30379746835443 0.22710873920044516

Public Service Commission, District 5 - Western Bibb 60460 1304 55999 1239 0.021567978828977836 0.02 2125395096341007 0.0005451911597622057

Public Service Commission, District 5 - Western Bleckley 4855 156 4598 148 0.032131822863027806 0.03 218790778599391 1.1103478666393036

Public Service Commission, District 5 - Western Brantley 5689 164 5501 160 0.028827561961680435 0.02 9085620796218868 0.7261992993684885

Public Service Commission, District 5 - Western Brooks 5696 144 5231 132 0.025280898876404494 0.0252 34180844962723 1.0299899941910269

Public Service Commission, District 5 - Western Bryan 14970 276 14388 265 0.01843687374749499 0.0184 18126216291353 1.0202278225083454

Public Service Commission, District 5 - Western Bulloch 23543 571 22467 545 0.024253493607441702 0.0 24257800329371967 1.0732926005375494

Public Service Commission, District 5 - Western Burke 8719 214 7751 197 0.024544099093932792 0.02541 6075345116758 0.15903705275728275

Public Service Commission, District 5 - Western Butts 8863 181 8483 171 0.02042197901387792 0.020157

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 Public Service Commission, District 5 - Western Calhoun 1899 46 1714 42 0.02422327540810953 0.024504
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 Public Service Commission, District 5 - Western Camden 17053 319 15860 300 0.018706385973142555 0.01
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 Public Service Commission, District 5 - Western Candler 3538 97 3418 94 0.027416619559072923 0.02750
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 Public Service Commission, District 5 - Western Carroll 41739 734 40221 697 0.017585471621265482 0.0
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 Public Service Commission, District 5 - Western Catoosa 23725 454 23185 444 0.019135932560590097 0.0
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 Public Service Commission, District 5 - Western Chattooga 7427 199 7202 195 0.026794129527400026 0.0
 2707581227436823 0.5469323520529134
 Public Service Commission, District 5 - Western Cherokee 106299 1991 100987 1880 0.01873018560851936
 7 0.018616257538098962 0.2548249894278961
 Public Service Commission, District 5 - Western Clarke 43261 1057 40239 996 0.02443309216153117 0.02
 475210616566018 0.1258436748503774
 Public Service Commission, District 5 - Western Clay 1186 43 1043 35 0.03625632377740304 0.033557046
 97986577 0.27180383270616326
 Public Service Commission, District 5 - Western Clayton 91840 1600 85993 1473 0.017421602787456445
 0.017129301222192504 0.013384911573349636
 Public Service Commission, District 5 - Western Clinch 2254 97 2145 95 0.04303460514640639 0.0442890
 4428904429 0.2815018577460857
 Public Service Commission, District 5 - Western Cobb 310381 5389 284480 4791 0.017362531856009226 0.
 01684125421822272 2.0081819532474214e-12
 Public Service Commission, District 5 - Western Coffee 12595 384 12200 378 0.030488289003572845 0.03
 0983606557377048 0.08031946812609643
 Public Service Commission, District 5 - Western Colquitt 12953 426 12439 413 0.032888134023006256 0.
 033202025886325266 0.3950841915491175
 Public Service Commission, District 5 - Western Columbia 61591 963 58655 911 0.015635401276160477 0.
 015531497741028044 0.3902133060252711
 Public Service Commission, District 5 - Western Cook 5803 119 5559 117 0.020506634499396863 0.021046
 950890447922 0.23287667687912428
 Public Service Commission, District 5 - Western Coweta 58056 1048 55244 987 0.018051536447567865 0.0
 1786619361378611 0.1628659628535605
 Public Service Commission, District 5 - Western Crawford 4931 136 4697 131 0.027580612451835327 0.02
 7890142644241004 0.7352351367354804

Public Service Commission, District 5 - Western Crisp 7024 265 6661 250 0.03772779043280182 0.037531
90211679928 0.7912783738379694

Public Service Commission, District 5 - Western Dade 5450 187 5321 175 0.03431192660550459 0.0328885
54782935536 0.0029161337895689996

Public Service Commission, District 5 - Western Dawson 11570 193 11131 191 0.016681071737251512 0.01
7159284880064685 0.04136901059191216

Public Service Commission, District 5 - Western DeKalb 310968 7052 291296 6574 0.022677574541431916
0.022568109414478742 0.12264575517350763

Public Service Commission, District 5 - Western Decatur 9043 203 8495 194 0.022448302554462014 0.022
836962919364334 0.4114108394989715

Public Service Commission, District 5 - Western Dodge 7051 316 6603 304 0.04481633810806978 0.046039
67893381796 0.06090673415279711

Public Service Commission, District 5 - Western Dooly 3793 170 3597 161 0.04481940416556815 0.044759
52182374201 1.0415674011791416

Public Service Commission, District 5 - Western Dougherty 31297 687 29353 638 0.021950985717480907
0.02173542738391306 0.34984639020223696

Public Service Commission, District 5 - Western Douglas 55197 740 51964 685 0.013406525716977372 0.0
13182203063659456 0.0859985864728365

Public Service Commission, District 5 - Western Early 4131 101 3658 85 0.024449285887194385 0.023236
741388737013 0.21904286105509319

Public Service Commission, District 5 - Western Echols 1143 36 1108 36 0.031496062992125984 0.032490
974729241874 0.6413169146224094

Public Service Commission, District 5 - Western Effingham 23365 421 22615 403 0.018018403595120906
0.01782003095290736 0.26868027138138983

Public Service Commission, District 5 - Western Elbert 7319 226 6756 220 0.030878535319032653 0.0325
6364712847839 0.002032951582612749

Public Service Commission, District 5 - Western Emanuel 7710 286 7320 273 0.037094682230869 0.037295
081967213116 0.8183761770801574

Public Service Commission, District 5 - Western Evans 3447 140 3248 135 0.040615027560197275 0.04156
403940886699 0.34029955221063424

Public Service Commission, District 5 - Western Fannin 11203 294 10545 277 0.026242970632866198 0.02
626837363679469 1.0744290948116275

Public Service Commission, District 5 - Western Fayette 57962 1018 55315 952 0.01756323108243332 0.0
17210521558347645 0.006094672951580157

Public Service Commission, District 5 - Western Floyd 30225 671 28965 641 0.022200165425971877 0.022
130157086138445 0.7457274302067718

Public Service Commission, District 5 - Western Forsyth 93239 1656 88811 1533 0.017760808245476677
0.017261375280089176 1.8837798464975777e-06

Public Service Commission, District 5 - Western Franklin 8149 149 7761 144 0.018284452080009818 0.01
8554310011596443 0.5601609085536978

Public Service Commission, District 5 - Western Fulton 421806 10398 403964 9746 0.02465114294249015
0.02412591220999891 1.173090842874586e-22

Public Service Commission, District 5 - Western Gilmer 12471 311 11912 301 0.024937855825515196 0.02

5268636668905307 0.34057429430248476
 Public Service Commission, District 5 - Western Glascock 1300 67 1219 65 0.05153846153846154 0.05332
 239540607055 0.393558468869634
 Public Service Commission, District 5 - Western Glynn 32501 649 30689 618 0.019968616350266144 0.020
 13750855355339 0.42310815660732837
 Public Service Commission, District 5 - Western Gordon 17772 485 17225 464 0.02729011928876885 0.026
 937590711175616 0.14787927263825196
 Public Service Commission, District 5 - Western Grady 8356 169 7956 160 0.02022498803255146 0.020110
 608345902465 0.8407083319994644
 Public Service Commission, District 5 - Western Greene 8989 161 8366 144 0.017910779842029146 0.0172
 12526894573272 0.10713206483891735
 Public Service Commission, District 5 - Western Gwinnett 312709 5171 292312 4829 0.01653614062914722
 5 0.016520019704972768 0.8051367655959298
 Public Service Commission, District 5 - Western Habersham 15495 358 14642 338 0.023104227170054857
 0.02308427810408414 1.0122663028762025
 Public Service Commission, District 5 - Western Hall 67282 1344 63789 1272 0.01997562498142148 0.019
 94074213422377 0.8171570638734527
 Public Service Commission, District 5 - Western Hancock 3539 167 3049 151 0.0471884713195818 0.04952
 443424073467 0.11887908051775431
 Public Service Commission, District 5 - Western Haralson 10585 214 10192 206 0.02021728861596599 0.0
 2021193092621664 1.0864801433358255
 Public Service Commission, District 5 - Western Harris 15972 292 15243 274 0.01828199348860506 0.017
 97546414747753 0.24236040515255847
 Public Service Commission, District 5 - Western Hart 9618 284 9178 276 0.029527968392597213 0.030071
 91109174112 0.18299005779717126
 Public Service Commission, District 5 - Western Heard 4051 91 3773 87 0.022463589237225377 0.0230585
 74078982243 0.4814567376073515
 Public Service Commission, District 5 - Western Henry 98365 1498 93368 1369 0.01522899405276267 0.01
 466241110444692 1.156010345915356e-08
 Public Service Commission, District 5 - Western Houston 59158 916 55968 857 0.015483958213597484 0.0
 1531232132647227 0.18432577933394206
 Public Service Commission, District 5 - Western Irwin 3556 89 3423 88 0.025028121484814397 0.0257084
 42886356996 0.2928814702730029
 Public Service Commission, District 5 - Western Jackson 26889 458 25870 442 0.01703298746699394 0.01
 7085427135678392 0.8604798787546384
 Public Service Commission, District 5 - Western Jasper 5907 111 5486 102 0.018791264601320468 0.0185
 9278162595698 0.7885853504297384
 Public Service Commission, District 5 - Western Jeff Davis 4815 197 4586 190 0.04091381100726895 0.0
 4143044047099869 0.5419296903754992
 Public Service Commission, District 5 - Western Jefferson 6756 272 6149 256 0.04026050917702783 0.04
 1632785818832334 0.0746451471338513
 Public Service Commission, District 5 - Western Jenkins 2856 85 2668 78 0.02976190476190476 0.029235
 38230884558 0.6510448288617523

Public Service Commission, District 5 - Western Johnson 3483 146 3247 133 0.04191788687912719 0.0409
6088697259008 0.3739981805513459

Public Service Commission, District 5 - Western Jones 12432 264 11648 240 0.021235521235521235 0.020
604395604395604 0.09048584097117787

Public Service Commission, District 5 - Western Lamar 7346 153 6942 141 0.02082766131227879 0.020311
14952463267 0.2713729615006901

Public Service Commission, District 5 - Western Lanier 2679 104 2571 100 0.03882045539380366 0.03889
5371450797356 1.1798596105129258

Public Service Commission, District 5 - Western Laurens 18939 574 17653 530 0.03030783040287238 0.03
0023225514076927 0.44014013339862756

Public Service Commission, District 5 - Western Lee 13549 217 13069 209 0.016015942135950992 0.01599
2042237355574 1.0104475279709573

Public Service Commission, District 5 - Western Liberty 15358 257 14408 243 0.016733949733038156 0.0
1686563020544142 0.7397947737960499

Public Service Commission, District 5 - Western Lincoln 3967 97 3617 93 0.024451726745651627 0.02571
191595244678 0.12180560809084388

Public Service Commission, District 5 - Western Long 3988 131 3819 129 0.03284854563691073 0.0337784
7604084839 0.15463710514728618

Public Service Commission, District 5 - Western Lowndes 35212 622 33322 581 0.01766443257980234 0.01
74359282155933 0.20649087103919786

Public Service Commission, District 5 - Western Lumpkin 11551 249 11084 238 0.021556575188295384 0.0
2147239263803681 0.8510427929384123

Public Service Commission, District 5 - Western Macon 4217 196 3886 183 0.04647853924590942 0.047092
12557900155 0.6268420351113634

Public Service Commission, District 5 - Western Madison 11697 294 11170 284 0.025134649910233394 0.0
25425246195165622 0.44354517250760017

Public Service Commission, District 5 - Western Marion 2930 93 2689 91 0.03174061433447099 0.0338415
7679434734 0.02765636651166906

Public Service Commission, District 5 - Western McDuffie 8792 172 7924 159 0.019563239308462238 0.02
0065623422513883 0.3718745948389663

Public Service Commission, District 5 - Western McIntosh 5408 155 4968 146 0.028661242603550297 0.02
938808373590982 0.355894289944239

Public Service Commission, District 5 - Western Meriwether 8639 219 8156 207 0.025350156268086583 0.
025380088278567924 1.0940121602665944

Public Service Commission, District 5 - Western Miller 2313 109 2181 103 0.04712494595763078 0.04722
604309949564 1.1385910463587023

Public Service Commission, District 5 - Western Mitchell 7446 156 6882 151 0.020950846091861403 0.02
1941296134844523 0.036672432668027076

Public Service Commission, District 5 - Western Monroe 12932 293 12236 283 0.022656974945870708 0.02
312847335730631 0.15486211657408733

Public Service Commission, District 5 - Western Montgomery 3528 140 3317 134 0.03968253968253968 0.0
4039794995477841 0.5131907229246476

Public Service Commission, District 5 - Western Morgan 9554 220 9144 204 0.023027004396064477 0.0223

0971128608924 0.05466533175230605
Public Service Commission, District 5 - Western Murray 11091 335 10826 324 0.030204670453520873 0.02
9927951228523923 0.3580275547171526
Public Service Commission, District 5 - Western Muscogee 63141 1274 58719 1188 0.020177064031295038
0.02023195217902212 0.7733221878202343
Public Service Commission, District 5 - Western Newton 43129 800 40394 757 0.01854900415033968 0.018
7404069911373 0.2880989761521879
Public Service Commission, District 5 - Western Oconee 20733 476 19802 447 0.02295856846573096 0.022
573477426522572 0.1202837055129326
Public Service Commission, District 5 - Western Oglethorpe 6484 172 6075 163 0.02652683528685996 0.0
2683127572016461 0.695117645501655
Public Service Commission, District 5 - Western Paulding 61222 994 57915 927 0.016235993597072947 0.
016006216006216007 0.0766314869492585
Public Service Commission, District 5 - Western Peach 10355 229 9910 218 0.022114920328343796 0.0219
9798183652876 0.792675496062349
Public Service Commission, District 5 - Western Pickens 13362 323 13140 316 0.024173027989821884 0.0
24048706240487064 0.5820561037769895
Public Service Commission, District 5 - Western Pierce 6883 115 6556 113 0.01670783088769432 0.01723
6119585112872 0.16728354434850806
Public Service Commission, District 5 - Western Pike 8534 145 8230 140 0.016990860089055544 0.017010
93560145808 1.1725803903565406
Public Service Commission, District 5 - Western Polk 12859 299 12412 295 0.023252196904891515 0.0237
67321946503384 0.03987970208163621
Public Service Commission, District 5 - Western Pulaski 3622 156 3390 144 0.04307012700165654 0.0424
7787610619469 0.591303853479195
Public Service Commission, District 5 - Western Putnam 9321 184 8723 177 0.019740371204806352 0.0202
91184225610454 0.1776297378552062
Public Service Commission, District 5 - Western Quitman 940 56 880 47 0.059574468085106386 0.0534090
90909090906 0.01342285417074256
Public Service Commission, District 5 - Western Rabun 7578 196 6735 172 0.025864344154130376 0.02553
8233110616183 0.6787100960207484
Public Service Commission, District 5 - Western Randolph 2788 93 2475 87 0.03335724533715925 0.03515
151515151515 0.17515856030177251
Public Service Commission, District 5 - Western Richmond 70043 1496 64729 1386 0.021358308467655584
0.02141234995133557 0.7766781701287755
Public Service Commission, District 5 - Western Rockdale 36600 549 34747 520 0.015 0.014965320747114
859 0.8679756248542636
Public Service Commission, District 5 - Western Schley 1931 59 1835 59 0.030554117037804248 0.032152
588555858314 0.09415527581014056
Public Service Commission, District 5 - Western Screven 5407 195 5136 189 0.036064361013501016 0.036
799065420560745 0.2675794565779546
Public Service Commission, District 5 - Western Seminole 3214 75 2950 67 0.023335407591785935 0.0227
1186440677966 0.5430594967203946

Public Service Commission, District 5 - Western Spalding 24385 644 23102 598 0.02640967808078737 0.025885204744177992 0.04484866487087142

Public Service Commission, District 5 - Western Stephens 9069 204 8533 190 0.022494211048627193 0.022266494784952538 0.6402134380663298

Public Service Commission, District 5 - Western Stewart 1784 146 1551 135 0.08183856502242152 0.08704061895551257 0.0421204678975389

Public Service Commission, District 5 - Western Sumter 10556 289 9679 267 0.027377794619173928 0.027585494369253023 0.7637525828603964

Public Service Commission, District 5 - Western Talbot 2952 149 2667 126 0.05047425474254742 0.047244094488188976 0.02836724592664313

Public Service Commission, District 5 - Western Taliaferro 917 82 755 67 0.08942202835332606 0.08874172185430464 0.9750644110224309

Public Service Commission, District 5 - Western Tattnall 6639 233 6247 224 0.03509564693477933 0.03585721146150152 0.21954603259521557

Public Service Commission, District 5 - Western Taylor 3265 96 3022 91 0.029402756508422664 0.030112508272667107 0.5371054667862808

Public Service Commission, District 5 - Western Telfair 3631 154 3300 148 0.04241255852382264 0.0448484848484846 0.019424675730026663

Public Service Commission, District 5 - Western Terrell 3930 127 3603 123 0.032315521628498725 0.03413821815154038 0.03078080554622569

Public Service Commission, District 5 - Western Thomas 17241 393 16250 377 0.022794501479032538 0.0232 0.17241499512802666

Public Service Commission, District 5 - Western Tift 13669 393 13108 384 0.028751188821420734 0.02929508696978944 0.07142525881580374

Public Service Commission, District 5 - Western Toombs 8851 233 8170 215 0.026324709072421196 0.02631578947368421 1.0582709695304873

Public Service Commission, District 5 - Western Towns 6132 170 5848 163 0.027723418134377037 0.02787277701778386 0.9322587028040169

Public Service Commission, District 5 - Western Treutlen 2610 114 2464 106 0.04367816091954023 0.04301948051948052 0.6087605455069713

Public Service Commission, District 5 - Western Troup 23663 485 22399 451 0.02049613320373579 0.02013482744765391 0.1298792381630499

Public Service Commission, District 5 - Western Turner 3269 110 3121 109 0.0336494340776996 0.03492470362063441 0.07170857879422024

Public Service Commission, District 5 - Western Twiggs 3787 135 3512 128 0.03564827039873251 0.03644646924829157 0.4471770187750836

Public Service Commission, District 5 - Western Union 11863 293 11381 279 0.02469864283907949 0.024514541780159917 0.6090116230548572

Public Service Commission, District 5 - Western Upson 10558 255 9956 243 0.024152301572267474 0.024407392527119324 0.5958370915441289

Public Service Commission, District 5 - Western Walker 21451 485 20638 466 0.02260966854692089 0.02257970733598217 0.9489688603052256

Public Service Commission, District 5 - Western Walton 38635 701 36866 666 0.018144169794228032 0.01

8065426137904846 0.6458197747078304
 Public Service Commission, District 5 - Western Ware 11004 209 10377 194 0.01899309342057434 0.01869
 5191288426328 0.4247145967232283
 Public Service Commission, District 5 - Western Warren 2260 81 2073 78 0.03584070796460177 0.0376266
 2807525326 0.17034714801558465
 Public Service Commission, District 5 - Western Washington 8159 363 7432 337 0.044490746415001836 0.
 04534445640473628 0.2678820104022079
 Public Service Commission, District 5 - Western Wayne 10122 261 9621 249 0.025785417901600473 0.0258
 80885562831305 0.9364324100734366
 Public Service Commission, District 5 - Western Webster 1100 42 948 37 0.038181818181818185 0.039029
 535864978905 0.930897630835706
 Public Service Commission, District 5 - Western Wheeler 1927 65 1812 62 0.033731188375713546 0.03421
 633554083885 0.898138914021616
 Public Service Commission, District 5 - Western White 11434 198 10897 188 0.017316774532097255 0.017
 252454804074516 0.9063220103137342
 Public Service Commission, District 5 - Western Whitfield 27302 705 26285 688 0.02582228408175225 0.
 02617462431044322 0.06556951727951156
 Public Service Commission, District 5 - Western Wilcox 2815 80 2610 74 0.028419182948490232 0.028352
 490421455937 1.0660068156500393
 Public Service Commission, District 5 - Western Wilkes 4371 163 4070 150 0.03729123770304278 0.03685
 5036855036855 0.6621223032847633
 Public Service Commission, District 5 - Western Wilkinson 4264 175 3994 168 0.04104127579737336 0.04
 206309464196294 0.2491133660137237
 Public Service Commission, District 5 - Western Worth 7831 198 7526 192 0.025284127186821607 0.02551
 1559925591284 0.6850700503010596

In [4]: contests_sig

Out[4]: Counter({'Lieutenant Governor': 101,
 'Secretary Of State': 4,
 'Attorney General': 4,
 'Commissioner Of Agriculture': 5,
 'Commissioner Of Insurance': 4,
 'State School Superintendent': 5,
 'Commissioner Of Labor': 2,
 'Public Service Commission, District 3 - Metro-Atlanta': 4,
 'Public Service Commission, District 5 - Western': 4})

```
In [5]: # version information
%load_ext version_information
%version_information scipy, numpy, csv, pandas, matplotlib, notebook, cryptorandom, permute

Loading extensions from ~/.ipython/extensions is deprecated. We recommend managing extensions like any other Python packages, in site-packages.

/anaconda/lib/python3.6/site-packages/IPython/core/formatters.py:839: FormatterWarning: JSON expects JSONable list/dict containers, not JSON strings
  FormatterWarning)
```

Out[5]:

Software	Version
Python	3.6.7 64bit [GCC 4.2.1 Compatible Clang 4.0.1 (tags/RELEASE_401/final)]
IPython	7.2.0
OS	Darwin 18.2.0 x86_64 i386 64bit
scipy	1.1.0
numpy	1.15.4
csv	1.0
pandas	0.23.1
matplotlib	3.0.2
notebook	5.7.4
cryptorandom	0.2
permute	0.1.alpha4
Sun Jan 06 12:23:30 2019 PST	

A
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IV

Vote distribution by machine in Winterville

For each contest, randomly partition votes onto 7 machines. Condition on the number of ballots cast per machine.

Test statistic is $\max_i |R_{im} - R_i|$, where R_{im} is the fraction of Republican votes cast on machine m in contest i , and R_i is the overall fraction of Republican votes in contest i .

Test for contests separately, and use Fisher's combining function for an overall test.

Compare results for the original data with results if D and R were swapped on machine 3.

```
In [1]: %matplotlib inline
import math
import numpy as np
import scipy as sp
import scipy.optimize
from scipy.stats import hypergeom, binom, norm, chi2
from scipy import special
from cryptorandom.cryptorandom import SHA256
from cryptorandom import sample
import matplotlib.pyplot as plt
import pandas as pd
import csv

seed = '2018CV313418 3463593937' # case caption number [space] 10 rolls of 10-sided dice
prng = SHA256(seed)
```



```
In [2]: votes = pd.read_csv('../Data/winterville.csv')
        votes.head()
```

```
Out[2]:
```

	Contest	Machine	Candidate	Party	Votes
0	Governor	0	B. KEMP (R)	R	40
1	Governor	0	S. ABRAMS (D)	D	73
2	Governor	0	T. METZ (L)	L	4
3	Governor	0	Write-in	W	0
4	Governor	1	B. KEMP (R)	R	51

```
In [3]: statewide_contests = np.array(["Governor", "Lt Governor", "Secretary of State", \
                                       "Attorney General", "Commissioner of Agriculture", \
                                       "Commissioner of Insurance", "State School Superintendent", "Commissio
ner of Labor",
                                       "PSC Eaton", "PSC Pridemore"])
```

```
In [4]: # Number of voters per machine taken from poll tape summary
num_voters_per_machine = [117, 135, 131, 133, 135, 144, 135] # double-checked
cum_voters_per_machine = np.cumsum(num_voters_per_machine)
cum_voters_per_machine = np.insert(cum_voters_per_machine, 0, 0)
num_votes = np.sum(num_voters_per_machine)

# Does any race on any machine has more votes than reported for the machine?
for m in range(len(num_voters_per_machine)):
    tmp = votes[votes["Machine"]==m]
    tot = tmp.groupby("Contest").agg(np.sum)
    assert np.all(tot["Votes"] <= num_voters_per_machine[m])
```

```
In [5]: # Find winning party within the precinct in each statewide contest
mask_D = votes['Party']=="D"
mask_R = votes['Party']=="R"
for c in statewide_contests:
    mask_c = votes["Contest"] == c
    D_votes = votes[mask_c & mask_D]['Votes'].sum()
    R_votes = votes[mask_c & mask_R]['Votes'].sum()
    print(c, D_votes, R_votes, '\t', ('DEM' if D_votes > R_votes else 'REP'))
```

```
Governor 505 400      DEM
Lt Governor 479 393   DEM
Secretary of State 511 365      DEM
Attorney General 509 390      DEM
Commissioner of Agriculture 475 423      DEM
Commissioner of Insurance 482 382      DEM
State School Superintendent 492 405      DEM
Commissioner of Labor 494 402      DEM
PSC Eaton 494 367      DEM
PSC Pridemore 487 374      DEM
```

```
In [6]: def get_repub_fraction(df):
    repub = df.loc[df["Party"]=="R"].copy()
    repub["R_votes"] = repub["Votes"]
    valid_votes = df.groupby(["Contest", "Machine"]).agg(np.sum).reset_index()
    valid_votes["Tot_votes"] = valid_votes["Votes"]
    combined = pd.merge(repub, valid_votes, on = ["Contest", "Machine"])
    return combined["R_votes"]/combined["Tot_votes"]
```

```

In [7]: def permute_votes_across_machines(vote_df, reps, prng=np.random):
        """
        Input: votes dataframe, filtered to contain only one contest

        """

        # Votes for Republican, Democrat/other, and undervotes
        votes_per_candidate = vote_df.groupby(["Party"]).agg(np.sum).reset_index()
        r_votes = int(votes_per_candidate.loc[votes_per_candidate["Party"] == "R", "Votes"])
        d_votes = np.sum(votes_per_candidate["Votes"]) - r_votes
        u_votes = num_votes - r_votes - d_votes
        overall_r_proportion = r_votes/(r_votes + d_votes)

        # test statistic = largest % votes for R on a machine
        votes_for_r = get_repub_fraction(vote_df)
        max_votes_for_r = np.max(votes_for_r)

        # Randomly assign r_votes 1s, d_votes 0s, and u_votes np.nans
        vote_list = np.array([1]*r_votes + [0]*d_votes + [np.nan]*u_votes)
        perm_distr = np.zeros(reps)

        for r in range(reps):
            prng.shuffle(vote_list)

            # Find fraction of votes for R on each machine
            votes_for_r_perm = np.zeros(len(num_voters_per_machine))
            for i in range(len(num_voters_per_machine)):
                votes_for_r_perm[i] = np.nanmean(vote_list[cum_voters_per_machine[i]:cum_voters_per_machine[i+1]])
            perm_distr[r] = np.max(votes_for_r_perm)

            # Center the statistic at the expected fraction of R votes
            perm_distr_norm = perm_distr - overall_r_proportion
            statistic_norm = max_votes_for_r - overall_r_proportion

        return {"statistic":max_votes_for_r,
                "pvalue":(1+np.sum(np.abs(perm_distr_norm) >= np.abs(statistic_norm)))/(reps+1)
                }

```

```

In [8]: reps=10000
        ps = {}
        for c in statewide_contests:
            vote_df = votes[votes["Contest"] == c]
            res = permute_votes_across_machines(vote_df, reps=reps, prng=prng)
            ps[c] = res['pvalue']
            print(c, "\n    statistic =", res["statistic"], "\n    P-value =", res["pvalue"])

        fisher_chi = -2*np.sum([math.log(p) for c, p in ps.items()])
        print('Combined:\n    ', fisher_chi, chi2.sf(fisher_chi, df=2*len(statewide_contests)))

```

Governor
 statistic = 0.5190839694656488
 P-value = 0.11398860113988601

Lt Governor
 statistic = 0.5645161290322581
 P-value = 0.0245975402459754

Secretary of State
 statistic = 0.5116279069767442
 P-value = 0.0184981501849815

Attorney General
 statistic = 0.515625
 P-value = 0.1506849315068493

Commissioner of Agriculture
 statistic = 0.5813953488372093
 P-value = 0.025997400259974

Commissioner of Insurance
 statistic = 0.5348837209302325
 P-value = 0.030496950304969503

State School Superintendent
 statistic = 0.5419847328244275
 P-value = 0.09669033096690331

Commissioner of Labor
 statistic = 0.5736434108527132
 P-value = 0.007899210078992101

PSC Eaton
 statistic = 0.5114503816793893
 P-value = 0.0456954304569543

PSC Pridemore
 statistic = 0.5267175572519084
 P-value = 0.025297470252974703

Combined:
 65.67868786714891 9.094420735646933e-07

What if D and R vote totals were flipped on Machine 3?

```
In [9]: votes_flipped = votes.copy()
votes_flipped.loc[(votes_flipped.Machine==3) & (votes.Party=="R"), 'Party'] = "D"
votes_flipped.loc[(votes_flipped.Machine==3) & (votes.Party=="D"), 'Party'] = "R"
votes_flipped.head(20)
```

Out[9]:

	Contest	Machine	Candidate	Party	Votes
0	Governor	0	B. KEMP (R)	R	40
1	Governor	0	S. ABRAMS (D)	D	73
2	Governor	0	T. METZ (L)	L	4
3	Governor	0	Write-in	W	0
4	Governor	1	B. KEMP (R)	R	51
5	Governor	1	S. ABRAMS (D)	D	79
6	Governor	1	T. METZ (L)	L	3
7	Governor	1	Write-in	W	0
8	Governor	2	B. KEMP (R)	R	60
9	Governor	2	S. ABRAMS (D)	D	67
10	Governor	2	T. METZ (L)	L	2
11	Governor	2	Write-in	W	0
12	Governor	3	B. KEMP (R)	D	68
13	Governor	3	S. ABRAMS (D)	R	59
14	Governor	3	T. METZ (L)	L	4
15	Governor	3	Write-in	W	0
16	Governor	4	B. KEMP (R)	R	65
17	Governor	4	S. ABRAMS (D)	D	67
18	Governor	4	T. METZ (L)	L	3
19	Governor	4	Write-in	W	0

```

In [10]: ps_flipped = {}
         for c in statewide_contests:
             vote_df2 = votes_flipped[votes_flipped["Contest"] == c]
             res = permute_votes_across_machines(vote_df2, reps=reps, prng=prng)
             ps_flipped[c] = res['pvalue']
             print(c, "\n    statistic =", res["statistic"], "\n    P-value =", res["pvalue"])

fisher_chi = -2*np.sum([math.log(p) for c, p in ps_flipped.items()])
print('Combined:\n    ', fisher_chi, chi2.sf(fisher_chi, df=2*len(statewide_contests)))

Governor
    statistic = 0.48148148148148145
    P-value = 0.46425357464253575
Lt Governor
    statistic = 0.4728682170542636
    P-value = 0.7945205479452054
Secretary of State
    statistic = 0.4496124031007752
    P-value = 0.44955504449555045
Attorney General
    statistic = 0.484375
    P-value = 0.5433456654334566
Commissioner of Agriculture
    statistic = 0.49230769230769234
    P-value = 0.7339266073392661
Commissioner of Insurance
    statistic = 0.4645669291338583
    P-value = 0.6042395760423958
State School Superintendent
    statistic = 0.48031496062992124
    P-value = 0.8065193480651934
Commissioner of Labor
    statistic = 0.46875
    P-value = 0.7967203279672033
PSC Eaton
    statistic = 0.4732824427480916
    P-value = 0.27987201279872015
PSC Pridemore
    statistic = 0.4307692307692308
    P-value = 0.9387061293870613
Combined:
    9.997865529313279 0.9682106300793477

```

```
In [11]: # version information
%load_ext version_information
%version_information scipy, numpy, csv, pandas, matplotlib, notebook, cryptorandom, permute

Loading extensions from ~/.ipython/extensions is deprecated. We recommend managing extensions like a
ny other Python packages, in site-packages.

/anaconda/lib/python3.6/site-packages/IPython/core/formatters.py:839: FormatterWarning: JSON expects
JSONable list/dict containers, not JSON strings
  FormatterWarning)
```

Out[11]:

Software	Version
Python	3.6.7 64bit [GCC 4.2.1 Compatible Clang 4.0.1 (tags/RELEASE_401/final)]
IPython	7.2.0
OS	Darwin 18.2.0 x86_64 i386 64bit
scipy	1.1.0
numpy	1.15.4
csv	1.0
pandas	0.23.1
matplotlib	3.0.2
notebook	5.7.4
cryptorandom	0.2
permute	0.1.alpha4
Sun Jan 06 14:03:18 2019 PST	

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**IN THE SUPERIOR COURT OF FULTON COUNTY
STATE OF GEORGIA**

**COALITION FOR GOOD
GOVERNANCE, RHONDA J.
MARTIN, SMYTHE DUVAL, AND
JEANNE DUFORT,**

**Plaintiffs,
v.**

**ROBYN A. CRITTENDEN,
Secretary of State of Georgia,
et al.,**

Defendants.

**CIVIL ACTION FILE
NO. 2018CV31348**

AFFIDAVIT OF CHRISTOPHER BRILL

Appeared before me, the undersigned officer duly authorized to administer oaths, Christopher Brill, who after being duly sworn states as follows:

1. Since 2006, I have devoted my career to the study of political processes in the United States generally, with a particular focus on research and analyses of political and electoral data, from precinct level to nationwide in scope.

2. My experience includes, but is not limited to, research and analyses of statewide voter files to identify socio-economic, geographic and other characteristics of voter file data.

3. I also have experience comparing and matching political and electoral data, including voter file data, against large and complex datasets; analyzing the results of such comparisons and matching; and identifying strengths and weaknesses in the methods, protocols and algorithms used in performing these kinds of analyses.

4. My experience also includes identifying reasons for false positive and false negative results when comparing or matching such data across large datasets and developing best practices for optimizing accurate matches and comparisons of data.

5. Since 2013, I have been employed as a Senior Data Analyst with TargetSmart Communications LLC, where my duties and responsibilities include, but are not limited to, collecting and analyzing political, electoral, consumer, demographic and other datasets; product development; and strategic consulting.

6. I obtained a Bachelor of Arts degree in Political Science from the University of New Mexico 2006. My current resume is attached and incorporated herein by reference as Exhibit B.

7. I have been retained by Plaintiffs' counsel in this matter to conduct analyses of the November 6th 2018 general election vote results in GA, with a focus on the under voting that took place with respect to the Lt. Governor's election; to offer my opinions concerning said data and analyses based upon by background,

training and experience; and to prepare a preliminary report summarizing my analyses of this data and opinions.

8. The sources used for the analysis are from officially published election result tabulations made available by the Secretary of State, as well as publicly available individual voter file data.

9. My preliminary report is attached and incorporated herein by reference as Exhibit A.

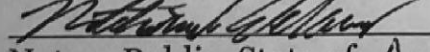
10. My opinions and preliminary report for the Coalition for Good Governance are based upon the information that has currently been made available to me and is accurate to the best of my knowledge and belief, and I would testify to these opinions if called upon to do so. I reserve the right to amend, supplement and otherwise update my opinions and report if additional information is made known to me during the pendency of this litigation.



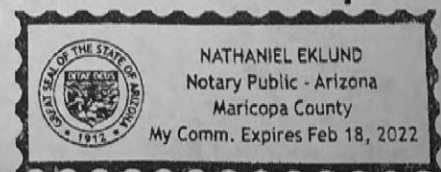
Christopher Brill

Sworn to and subscribed before me:

On this 7th day of January, 2019


Notary Public, State of Arizona

My Commission Expires: Feb. 18, 2022



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To: Marilyn Marks
From: Christopher Brill, Senior Data Analyst
Date: January 5th 2019
Subject: Exhibit A: Analysis of the 2018 Georgia Lt. Governor undervote

Research Summary

The purpose of this analysis is to examine for possible irregularities in the number of votes cast for the 2018 Lieutenant Governor's election in Georgia. TargetSmart was approached by Marilyn Marks, Executive Director, for the Coalition for Good Governance to examine what appeared to be a significantly lower number of votes being cast for the Lt. Governor's election than all other statewide constitutional offices in the November 6, 2018 election

TargetSmart is considered an industry leader in voter data and political campaign services. In addition to maintaining a nationwide voter file, TargetSmart also maintains a nationwide repository of election results allowing us to examine electoral trends across states and time. For this project, the lead researcher also has over a dozen years' experience collecting and analyzing publicly available election results.

The primary question we want to probe: "was the undervote that occurred during the Lt. Governor election consistent with historic patterns and do the factors that we know contribute to higher rates of under voting apply to this election?"

After an initial examination of the state, county and precinct level results from the 2018 election in Georgia it is our initial conclusion that the vote totals published cast substantial doubt on the final vote total of the Lt. Governor election. The undervote that occurred for the Lt Governor election is simply not consistent with patterns of undervote seen previously in Georgia, or around the country.

Defining Under voting

Before presenting our case, it may help to define terms. Quite simply, an undervote occurs when a voter decides, or by accident, does not vote for a specific office or issue on the ballot. While voters might have countless motivations while in the voting booth on what they do and do not vote for, when it comes to under voting there are generally 3 variables that are most associated with high undervote rates:

- 1) **Low visibility:** If an election on a ballot is not well known to the public, is further down the ballot, or both then a higher undervote is likely to occur. For instance, an office such as 'Community College District Board' might generally suffer from high rates of under voting because voters are not familiar with the office or do not know any of the candidates.
- 2) **Non-Partisan/Lack of partisan cues:** If an election on a ballot is non-partisan, that election may experience a higher rate of under voting. Research shows that voters tend to use a candidate's party affiliation as a 'cue' for whether they should vote one way or another, even if they are unsure who the candidate is. When this cue is not present for non-partisan elections, more voters are likely to skip the contest altogether, resulting in higher rates of under voting.
- 3) **Uncompetitive election/Only one major party on the ballot:** If an election is not competitive, or only one major party has a candidate on the ballot, and is near assured victory before Election Day, under voting tends to be higher. The lower the stakes of the election, the higher the under voting tends to be.

A Focus on the Lt. Governor Election

When the vote totals for the 2018 Lt. Governor election are compared to the other 8 statewide constitutional offices an anomaly becomes visible: Tens of thousands of fewer votes were cast for Lt Governor than any of the other elected offices at the top of the ballot. Table 1 below compares the number of votes cast for Governor in 2018 to the remaining statewide, partisan, constitutional offices.

Table 1: Total 2018 Undervote by Office

Office	2018	Under Vote	Drop Off vs Gov
Governor	3,939,328		
Lt. Governor	3,780,304	-159,024	4.0%
Secretary of State	3,883,594	-55,734	1.4%
Attorney General	3,862,370	-76,958	2.0%
Commissioner of Agriculture	3,843,480	-95,848	2.4%
Commissioner of Insurance	3,861,625	-77,703	2.0%
State School Superintendent	3,862,464	-76,864	2.0%
Commissioner of Labor	3,849,450	-89,878	2.3%

Based on our understanding of the factors that encourage higher rates of under voting (as outlined in the previous section), the Lt. Governor's election would not seem to contain any of the defining variables we usually see when higher than normal under voting occurs. The Lt Governor's election, position wise on the ballot, was directly below one of the most competitive and highly publicized elections for Governor in years. The election was partisan, and the election was extremely competitive (much like other statewide offices on the ballot), with the winner receiving just 51.6% of the vote. **In short, there is little reason to suspect that under voting should be higher for Lt Governor than any of the other 8 constitutional offices based on its competitiveness, position on the ballot or its partisan classification.** Yet, under voting was more than *two times higher* than under voting for Attorney General, and *three times higher* than that for Secretary of State. The question becomes, why?

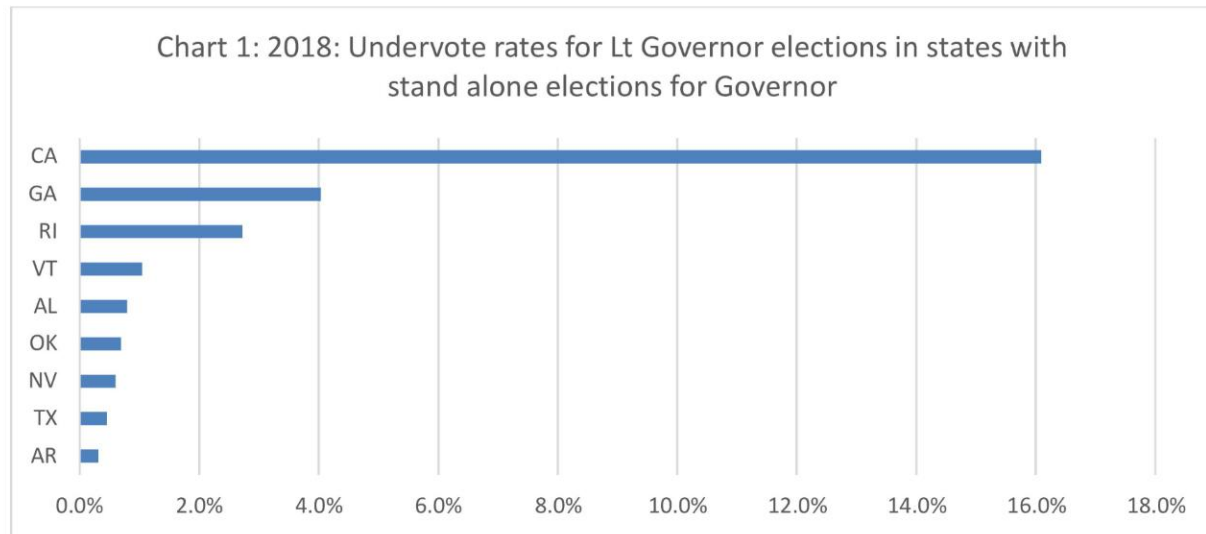
This anomaly becomes more apparent when examining past elections. Table 2 below compares drop off percentages for each of the state's 8 constitutional offices by election cycle since 2002:

Table 2: % Decrease in votes cast compared to that years gubernatorial contest

	2018	2014	2010	2006	2002
Lt. Governor	4.0%	0.8%	0.3%	1.2%	0.9%
Secretary of State	1.4%	0.9%	0.9%	2.8%	1.0%
Attorney General	2.0%	1.0%	0.9%	2.3%	2.8%
Commissioner of Agriculture	2.4%	1.6%	1.2%	1.8%	2.1%
Commissioner of Insurance	2.0%	1.2%	1.2%	2.4%	2.1%
State School Superintendent	2.0%	1.0%	0.9%	1.1%	1.2%
Commissioner of Labor	2.3%	1.7%	1.6%	3.1%	2.8%

In this context, the historic nature of the undervote becomes clear: Since 2002, the undervote percentage compared to Governor, for all constitutional offices has averaged 1.6%. The 4% drop-off seen here is more than 3 standard deviations away from that mean, further indicating the drop-off seen here is an extreme outlier. Overall, the 4% drop-off between Lt Governor and Governor is the largest gap seen in a mid-term this century in Georgia.

Finally, a quick comparison to similar Lt Governor elections that took place elsewhere in 2018 highlights the strangeness of the result in GA. Chart 1 below examines the undervote rate in the 9 states with stand alone elections for Lt. Governor in 2018:



Out of all states, only CA had a higher undervote percentage. Why? Because in 2018, due to California's top two primary set up, just two Democratic candidates were on the ballot- there were no Republican candidates or third-party candidates for voters to choose from; again, an ingredient for higher rates of under voting. Minus California, GA's Lt Governor under vote was the highest among all Lt Governor contests in the country in 2018.

Georgia's 2018 State Representative Elections

Second, an examination of the county and precinct level data from the 2018 election raises additional questions about the reasonableness of the Lt. Governor reported vote tallies. Specifically, if we go even further down the ballot, and examine state representative, otherwise known as 'state house' elections, we see Lt Governor vote totals that are even lower than those for non-competitive state representative elections.

To recap, there were 180 state representative seats up for election in 2018, with as many as 110 of those seats 'uncontested', meaning only 1 major party had a general election candidate on the ballot to choose from. Not surprisingly, this number of uncontested seats resulted in a smaller number of votes cast for state representative. In total just 3,470,967 votes were cast for a state representative in Georgia, or 468,351 fewer votes than cast for Governor, an aggregate drop off of almost 12%. Again, this makes sense based on our knowledge of under voting: uncompetitive or uncontested elections tend to yield smaller vote totals.

With that context present, an analysis of the votes cast across the state's 2,636 precincts show that, inexplicably, more votes were cast for State Representative than Lt Governor in *1,012 precincts, or 38% of all precincts*. Further, in 137 of those 1,012 precincts, the Democratic candidate for State Representative received 100% of the total votes cast for that contest. Ultimately this raises the question: **Why would more voters in a precinct vote in an uncontested or uncompetitive State Representative election than for an election further up the ballot that is contested and competitive?**

To further illustrate this point, we compare state representative vote totals to another statewide election with what appear to be normal rates of under voting: Attorney General. In total there were just 410 precincts where there were more votes cast for State Representative than Attorney General. **In just**

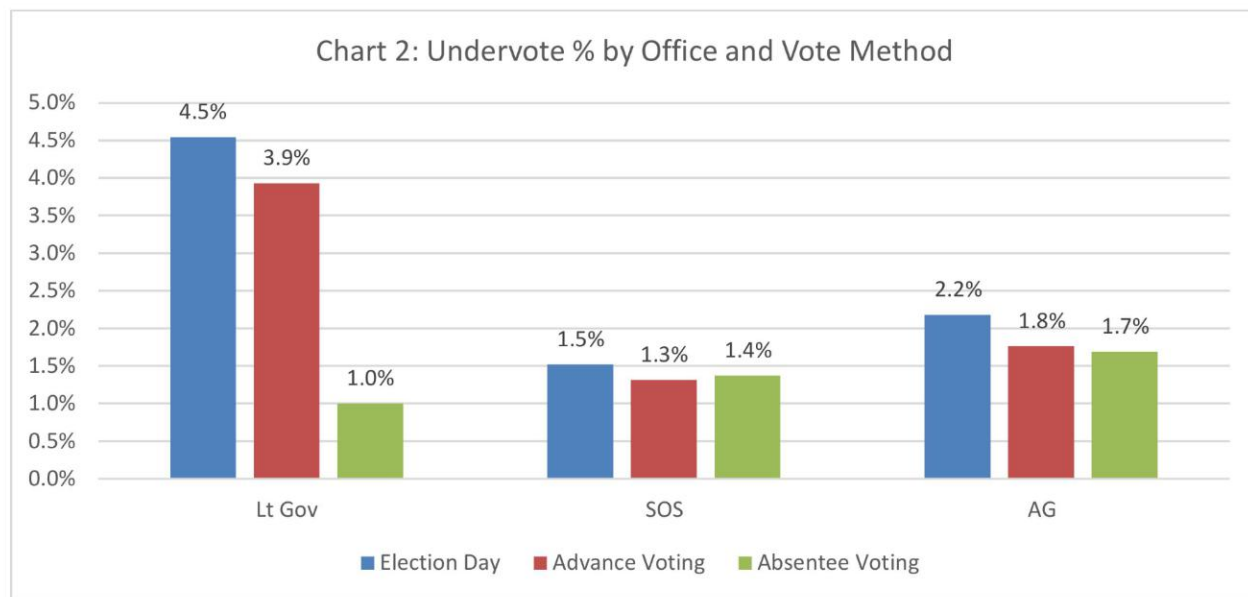
two of those precincts did the Democratic candidate for State Representative receive 100% of the votes. This would line up with our established expectations: if a down ballot election such as state representative, garnered more votes than a statewide election, it would be in precincts with more locally competitive representative elections, and not where candidates are receiving 100% of the vote.

Addressing Voter Choice and Vote Method

We believe that the data presented thus far, combined with the necessary context around what variables accompany higher rates of under voting, shows striking irregularities in the total vote for Lt Governor, that ultimately call into question the accuracy of the vote and the legitimacy of the outcome

With that said, we can't ultimately rule out with 100% certainty that a group of voters decided, *intentionally*, to not vote for Lt. Governor. However, what makes this intention even more unlikely is how the under vote for Lt Governor breaks down when comparing **vote method**. In this context, vote method refers to how a voter decided to cast their ballot- either through mail in absentee, in person early voting (or 'advance voting') and finally Election Day voting at the polls. Early voting and Election Day voting are conducted on electronic machines and mail in absentee is voted on paper ballots.

After examining county level results released by the Secretary of State, we found that there were significant differences in the Lt Governor under vote, depending on the method of vote. For instance, the voting machine election day under vote was approximately 4.5%, while the undervote was as little as 1% among absentee by mail voters, who voted on paper. This is an additional oddity in the data, especially when, as chart 2 demonstrates below, under vote rates are more consistent across method of voting for other offices such as Secretary of State (SOS) and Attorney General (AG):



According to data on the GA voter file, absentee voters tended to skew somewhat older, more Democratic (according to our partisanship modeling) and more African American; but it is unlikely that such a modest skew could have accounted for such a large difference in the under vote between absentee and election day voters. **Therefore, if voters were deliberately under voting in the Lt Governor election, why would that not be consistent across all vote methods? Instead, we would speculate that the key difference here is the technology that is being used to administer absentee votes vs in person votes, and not differences in the voters who selected one vote method or the other.**

Conclusion

In conclusion, based on our analysis of the publicly available data, it is our opinion that the undervote totals reflected in the Lt Governor's race are extremely suspect and irregular and cast a serious doubt over the accuracy of the final vote count and the certified outcome of the Lt. Governor's contest.

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Christopher A. Brill

826 E Lamar Rd
Phoenix AZ 85014

602-295-3389
cbrillaz@gmail.com

Employment History

Senior Data Analyst

TARGETSMART COMMUNICATIONS

Phoenix, AZ. Feb 2013 to Present

- Currently provide support and data analysis to progressive issue and candidate campaigns as well as 501c(3) and c(4) organizations around the United States with a focus on helping clients optimize and execute outreach programs.
- Currently manage the data and targeting efforts for Arizona based progressive coalitions such as Arizona Wins and One Arizona.
- Lead project manager for TargetSmart's 'ElectionBase': a nationwide precinct level election database, merged with voter file and other data sets, in order to provide comprehensive district level profiles and Democratic performance projections.
- Lead client services representative for a wide range of organizations such as America Votes and the Democratic Legislative Campaign Committee (DLCC)

National Data Director

DEMOCRATIC NATIONAL COMMITTEE (DNC)

Washington D.C. Aug 2011 to Jan 2013

- Managed a 7-figure budget as well as a team of 9 people and was responsible for the day to day operations of the DNC data department including data acquisition, analysis and data support services.
- Lead director for the committee's national voter file. Coordinated with the presidential campaign, other national committees and all 50 state parties on voter file, data services and support needs.
- Managed day-to-day vendor and consultant relationships in relation to the national voter file, as well as developed in-house data testing to inform vendor selection process.

Acquisitions Manager

DEMOCRATIC NATIONAL COMMITTEE (DNC)

Washington D.C. Apr 2010 to Aug 2011

- Led the data acquisition team at the DNC and was responsible for acquiring voter file data nationwide as well as establishing a national voter file and data update schedule.
- Provided voter file and data support to state party committees, other national party committees such as the DCCC, DSCC and Organizing for America.

Elections and Targeting Director

ARIZONA DEMOCRATIC PARTY (ADP)

Phoenix AZ. June 2008- April 2010

- Developed and implemented the Coordinated Campaign's vote by mail application chase program in 2008 as well as Permanent Early Voter sign up programs in 2009.
- Compiled and aggregated data to provide daily and weekly briefings with campaign principals, partner organizations and ADP staff.
- Provided voter targeting and data assistance to campaigns, elected officials and party leaders.

Voter File Director

ARIZONA DEMOCRATIC PARTY (ADP)

Phoenix AZ. June 2006- June 2008

- Maintained statewide voter file by coordinating with state, county and city election officials, party staff and data vendors.
- Cultivated relationships with key ADP stakeholders with the goal of promoting the use of a single statewide voter file for local party affiliates and candidates.
- Developed voter file training programs for state party staff, volunteers and candidates.

Skills and Core Competencies

- Core competencies include project management, data acquisition, manipulation and cleaning (data wrangling) visualization, research, and analysis.
- Proficient in multiple progressive software platforms such as NGP-VAN, Blocks, Q-Tool, M-Tool, RegTrak, Grassroots Unwired and Hustle.
- Proficient in data manipulation using tools such as using SQL, R, Vertica and Alteryx.
- Proficient in mapping platforms using ArcGis and Google Fusion Tables.
- Proficient in Microsoft Office products including Outlook, Excel, Word and PowerPoint.

Education

UNIVERSITY OF NEW MEXICO, Albuquerque NM. 2002-2006
Studies leading to a BACHELORS of ARTS in Political Science

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**IN THE SUPERIOR COURT OF FULTON COUNTY
STATE OF GEORGIA**

**COALITION FOR GOOD
GOVERNANCE, RHONDA J.
MARTIN, SMYTHE DUVAL, AND
JEANNE DUFORT,**

**Plaintiffs,
v.**

**CIVIL ACTION FILE
NO. 2018CV31348**

**ROBYN A. CRITTENDEN,
Secretary of State of Georgia,
et al.,**

Defendants.

AFFIDAVIT OF MICHAEL S. JOHNSON

Appeared before me, the undersigned officer duly authorized to administer oaths,

MICHAEL S. JOHNSON ("Affiant") who, after being sworn, states as follows:

1. I am of lawful age and give this affidavit based on my personal knowledge.
2. I am a registered voter in Cobb County, Georgia.
3. I was appointed as a statewide poll watcher for the November 6, 2018 election, by the Libertarian Party of Georgia. I observed activities at various polling places in the metro Atlanta area during early voting and on Election Day.
4. On November 6, Election Day morning, I observed the voting activities at Grady High School polling place which includes precincts, 02J, 02K, and 06G. I spent approximately

twenty minutes observing at the Grady High School polling place. Grady High School is in Atlanta and Fulton County, Georgia.

5. I observed ten (10) DRE voting machines in use during my visit which lasted about 20 minutes. I did not observe any spare DRE units, or units that were not in service.

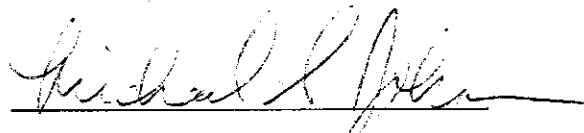
6. I did not notice any malfunctioning or problems with machines during my brief visit.

7. The line of voters awaiting the use of machines was quite long and snaked around the interior of gymnasium. I noticed the inadequate number of machines for use and asked a pollworker about the bottleneck at the machines. She replied that there were not enough machines.

8. The picture of the Grady High School polling place attached as Exhibit A is an accurate reflection of the set up of the polling place with 10 DRE machines as I observed it on the morning of November 6.

9. I received the picture from Marilyn Marks of Coalition for Good Governance. I understand that the picture on Election Day morning was taken as part of a video by an HBO film crew. I met this film crew at other polling locations during the day as they were filming Georgia voting activities.

Further affiant sayeth not.



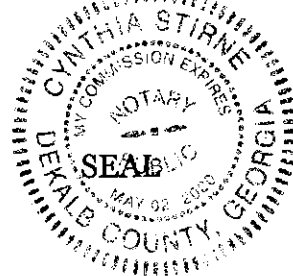
Michael S. Johnson

Sworn to and subscribed before me:

On this 1 day of September, 2019

Notary Public, State of Georgia

My Commission Expires: 05/02/2020



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**IN THE SUPERIOR COURT OF FULTON COUNTY
STATE OF GEORGIA**

**COALITION FOR GOOD
GOVERNANCE, RHONDA J.
MARTIN, SMYTHE DUVAL, AND
JEANNE DUFORT,**

**Plaintiffs,
v.**

**ROBYN A. CRITTENDEN,
Secretary of State of Georgia,
et al.,**

Defendants.

**CIVIL ACTION FILE
NO. 2018CV31348**

AFFIDAVIT OF TARAN GREENWALD

Appeared before me, the undersigned officer duly authorized to administer oaths,
TARAN GREENWALD ("Affiant") who, after being sworn, states as follows:

1. I am an analyst for Coalition for Good Governance, a Plaintiff in this action.
2. For the November 6, 2018 Georgia general election, I was a volunteer for candidates and various election transparency advocacy groups seeking to document reports of election results by photographing the DRE machine poll tapes once they were posted on the doors of the polling places after the closing of the polls and the printing of the machine tapes.
3. In Fulton County, after the close of the polls, machine results for each machine in operation in the polling place on Election Day are printed and one copy of each DRE machine tape is posted to or near the door of the polling place for public observation.

4. I took photographs at several polling places on the evening of November 6, shortly after the tapes had been posted. I took the photos of 14 DRE machine tapes at Grady High School polling place in Atlanta at approximately 9 p.m.

5. Those photographs are on Exhibit A. I prepared this exhibit from my original photographs and have not altered or edited the contents of the machine tapes.

6. With the assistance of Coalition for Good Governance's other part time analyst, Samantha Whitley, I prepared a transcript of the information on the tape photographs. That transcript on Exhibit B.

7. Ms. Whitley and I also reviewed the officially reported tallies on the Secretary of State's website for each race for each precinct located in the Grady High School polling place. Those were precincts 02J, 02K, and O6G. The Secretary of State's website showing Fulton County results is <https://results.enr.clarityelections.com/GA/Fulton/91700/Web02.221448/#/>

8. The above referenced Secretary of State results exclude write-in votes, which we accounted for on the worksheet in Exhibit B.

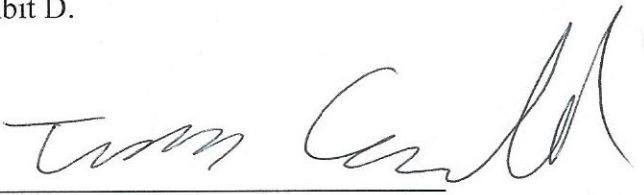
9. Coalition for Good Governance obtained the Grady High School polling place recap sheet (Exhibit C) through a public records request to Fulton County Elections Office. The recap sheet lists the ten (10) DRE machine by serial numbers that were assigned to the Grady polling place. Eight (8) machine serial numbers match the machine serial numbers on the 14 poll tapes. Seven (7) machine tapes were posted on the door that were not listed on the polling place recap sheet. All 14 poll tapes showed print times of approximately 7:30 pm as would be expected after 7pm poll closing time.

10. I have collected photographs of election night machine poll tapes from a number of other polling places from other volunteers and citizens who shared them with Coalition for Good Governance.

11. One of the sets of election night photos I obtained was Midvale Elementary School in DeKalb County. Exhibit D is a pdf compilation of the photographs that I received from other citizens who took these photographs. The photographs can be compared to DeKalb County's copy of these tapes to verify the accuracy of the data.

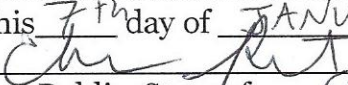
12. I prepared Exhibit E by comparing the Secretary of State's vote tallies by precinct for DeKalb County posted at this link, <https://results.enr.clarityelections.com/GA/DeKalb/91684/Web02.221448/#/> to the Election Day vote tallies with the Midvale polling place tape on Exhibit D.

Further Affiant sayeth not.


Taran Greenwald

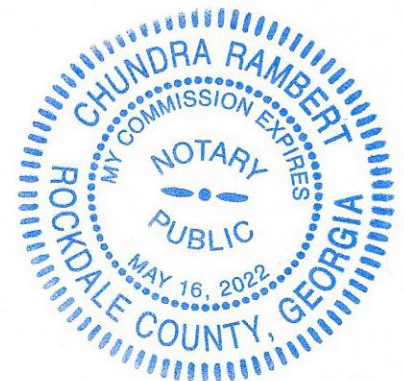
Sworn to and subscribed before me:

On this 7th day of JANUARY, 2019


Notary Public, State of GA

My Commission Expires: 5/16/22

SEAL



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B
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A

ELECTION RESULTS REPORT

Fulton County
State of
Georgia General Election

November 6, 2018

DATE: Nov-06-2018

POLL CTR: 280{00
02J, 02K & 06G

MACHINE ID: 2

VERSION: 2 COPY: 0

COUNT: 0 SIZE: 32M

ACCU-VOTE RELEASE: 4, 5, 2

REPORT: US 1, 14, 7

TIME: 19:26 11/06/2018

MACHINE SERIAL: 124301

PUBLIC COUNTER: 149

SYSTEM COUNTER: 2122

** PRECINCT: 220 **

02J

BALLOTS CAST 89

GOVERNOR

RACE # 3

B. KEMP (R) 11

S. ABRAMS (D) 75

T. METZ (L) 3

Write-in 0

WRITE-INS 0

 BALLOTS CAST 89

 GOVERNOR
 RACE # 3

B. KEMP (R) 11
 S. ABRAMS (D) 75
 T. METZ (L) 3
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

 LT GOVERNOR
 RACE # 5

G. DUNCAN (R) 13
 S. R. AMICO (D) 73
 Write-in 1
 # WRITE-INS 1

Write In Candidates
 Ballot Candidate

820225 DYLAN SAGER

 SECRETARY OF STATE
 RACE # 7

B. RAFFENSPERGER (R) 11
 J. BARROW (D) 71
 S. DUVAL (L) 6
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

 ATTORNEY GENERAL

 ATTORNEY GENERAL
 RACE # 9

C. CARR (I) R 15
 C. BAILEY (D) 72
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

 AGRICULTURE COMMISSIONER
 RACE # 11

G. BLACK (I) R 20
 F. SWANN (D) 66
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

 INSURANCE COMMISSIONER
 RACE # 13

J. BECK (R) 12
 J. LAWS (D) 68
 D. FOSTER (L) 7
 Write-in 0
 # WRITE-INS 0

Write In Candidates

 STATE SCHOOL SUPERINTENDENT
 RACE # 15

R. WOODS (I) R 17
 O. THORNTON, JR. (D) 68
 Write-in 1
 # WRITE-INS 1

Write In Candidates
 Ballot Candidate

*164866 SID CHAPMAN

LABOR COMMISSIONER
 RACE # 17

M. BUTLER (I) R 17
 R. KEATLEY (D) 69
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

PSC EATON
 RACE # 19

C. EATON (I) R 14
 L. MILLER (D) 68
 R. GRAHAM (L) 6
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

 PSC PRIDEMORE
 RACE # 21

T. PRIDEMORE (I) R 12
 D. A. RANDOLPH (D) 68
 J. TURPISH (L) 7
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

US HOUSE 5
 RACE # 40

J. R. LEWIS (I) D 80
 Write-in 1
 # WRITE-INS 1

Write In Candidates
 Ballot Candidate

718390 ALEXANDER PAUL LORENZ

US HOUSE 6
 RACE # 55

K. HANDEL (I) R 0
 L. MCBATH (D) 0
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

US HOUSE 11
 RACE # 65

B. LOUDERMILK (I) R 0
 F. D. BRADY, JR (D) 0
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

N. ORROCK (I) D 81
 Write-in 1
 # WRITE-INS 1
 Write In Candidates
 Ballot Candidate
 718390 ALEXANDER PAUL LORENZ

 STATE HOUSE 58
 RACE # 355

P. CANNON (I) D 81
 Write-in 1
 # WRITE-INS 1
 Write In Candidates
 Ballot Candidate
 718390 ALEXANDER PAUL LORENZ

 CO COMM CHAIRPERSON
 RACE # 450

R. PITTS (I) D 77
 Write-in 1
 # WRITE-INS 1
 Write In Candidates
 Ballot Candidate
 718390 ALEXANDER PAUL LORENZ

 SOIL AND WATER
 RACE # 550

V. S. REKUC, JR (I) 58
 J. R. ULSETH 40
 Write-in 1
 Write-in 0
 # WRITE-INS 1
 Write In Candidates
 Ballot Candidate
 103168 NA

 CONST WRENSHENT 1
 RACE # 560

 ELECTION RESULTS REPORT

 - Fulton County
 State of
 Georgia General Election

November 6, 2018
 DATE: Nov-06-2018
 POLL CTR: 280100
 02J, 02K & 06G
 MACHINE ID: 3
 VERSION: 2 COPY: 0
 COUNT: 0 SIZE: 32M
 ACCU-VOTE RELEASE: 4, 5, 2
 REPORT: —US 1, 14, 7

TIME: 19:26 11/06/2018
 MACHINE SERIAL: 136081
 PUBLIC COUNTER: 141
 SYSTEM COUNTER: 1271

 ** PRECINCT: 220 **
 02J

 BALLOTS CAST 78

 GOVERNOR
 RACE # 3

REP (R) 8

GOVERNOR
RACE # 3

B. KEMP (R)	8
S. ABRAMS (D)	68
T. METZ (L)	2
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

LT GOVERNOR

RACE # 5

G. DUNCAN (R)	9
S. R. AMICO (D)	67
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

SECRETARY OF STATE

RACE # 7

B. RAFFENSPERGER (R)	8
J. BARROW (D)	66
S. DUVAL (L)	4
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

ATTORNEY GENERAL

RACE # 9

C. CARR (I) R	14
C. BAILEY (D)	64
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

AGRICULTURE COMMISSIONER
RACE # 11

G. BLACK (I) R	21
F. SWANN (D)	54
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

INSURANCE COMMISSIONER

RACE # 13

J. BECK (R)	13
J. LAWS (D)	56
D. FOSTER (L)	4
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

STATE SCHOOL SUPERINTENDENT

RACE # 15

R. WOODS (I) R	20
D. THORNTON, JR. (D)	56
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

LABOR COMMISSIONER

RACE # 17

M. BUTLER (I) R	17
R. KEATLEY (D)	58
Write-in	0
# WRITE-INS	0

PSC EATON

RACE # 19

C. EATON (I) R	7
L. MILLER (D)	62
R. GRAHAM (L)	5
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

PSC PRIDEMORE

RACE # 21

T. PRIDEMORE (I) R	12
D. A. RANDOLPH (D)	58
J. TURPISH (L)	4
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

US HOUSE 5

RACE # 40

J. R. LEWIS (I) D	72
Write-in	1
# WRITE-INS	1

Write In Candidates

Ballot Candidate

506146 CLARK HOWARD

STATE SENATE 36

RACE # 145

N. ORROCK (I) D	69
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

STATE HOUSE 58

RACE # 355

P. CANNON (I) D	69
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

CO COMM CHAIRPERSON

RACE # 450

R. PITTS (I) D	70
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

SOIL AND WATER

RACE # 550

W. S. REXUC, JR (I)	56
J. R. ULSETH	36
Write-in	0
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

CONST AMENDMENT 1

RACE # 560

YES	67
NO	11

CONST AMENDMENT 2

RACE # 570

ELECTION RESULTS REPORT

Fulton County
State of
Georgia General Election

November 6, 2018
DATE: Nov-06-2018
POLL CTR: 280100
02J, 02K & 06G
MACHINE ID: 4
VERSION: 2 COPY: 0
COUNT: 0 SIZE: 32M
ACCU-VOTE RELEASE: 4, 5, 2
REPORT: US 1, 14, 7

TIME: 19:31 11/06/2018
MACHINE SERIAL: 143944
PUBLIC COUNTER: 140
SYSTEM COUNTER: 1386

*** SUMMARY TOTALS

BALLOTS CAST BY PRECINCT	PRECINCT	QUANTITY
	220	83
	225	42
	700	15

TOTAL BALLOTS 140

GOVERNOR
RACE # 3

B. KEMP (R)	21
S. ABRAMS (D)	113

GOVERNOR
RACE # 3

B. KEMP (R)	21
S. ABRAMS (D)	113
T. METZ (L)	5
Write-in	1
# WRITE-INS	1

Write In Candidates
Ballot Candidate
147243 NATHAN DEAL

LT GOVERNOR
RACE # 5

G. DUNCAN (R)	26
S. R. AMICO (D)	110
Write-in	0
# WRITE-INS	0

Write In Candidates
Ballot Candidate

SECRETARY OF STATE
RACE # 7

B. RAFFENSPERGER (R)	22
----------------------	----

SECRETARY OF STATE
RACE # 7

B. RAFFENSPERGER (R) 22
J. BARROW (D) 107
S. DUVAL (L) 11
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

ATTORNEY GENERAL
RACE # 9

C. CARR (I) R 27
C. BAILEY (D) 111
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

AGRICULTURE COMMISSIONER
RACE # 11

G. BLACK (I) R 35
F. SWANN (D) 97
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

INSURANCE COMMISSIONER
RACE # 13

J. BECK (R) 24
J. LAWS (D) 99
D. FOSTER (L) 8
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

STATE SCHOOL SUPERINTENDENT
RACE # 15

R. WOODS (I) R 36
O. THORNTON, JR. (D) 95
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

LABOR COMMISSIONER
RACE # 17

M. BUTLER (I) R 30
R. KEATLEY (D) 100
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

PSC EATON
RACE # 19

C. EATON (I) R 22
L. MILLER (D) 103
R. GRAHAM (L) 7
Write-in 0
WRITE-INS 0

Write In Candidates

PSC PRIDEMORE

RACE # 21

T. PRIDEMORE (I) R 23

D. A. RANDOLPH (D) 98

J. TURPISH (L) 9

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

US HOUSE 5

RACE # 40

J. R. LEWIS (I) D 121

Write-in 5

WRITE-INS 5

Write In Candidates

Ballot Candidate

820920 ANYBODY ELSE

716377 ANYONE ELSE PLEASE

668742 JOHN WAYNE

623867 NOT HIM

729416 TED TURNER

US HOUSE 6

RACE # 55

K. HANDEL (I) R 0

L. MCBATH (D) 0

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

US HOUSE 11

US HOUSE 13

RACE # 73

D. CALLAHAN (R) 0

D. SCOTT (I) (D) 0

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

STATE SENATE 36

RACE # 145

N. ORROCK (I) D 119

Write-in 2

WRITE-INS 2

Write In Candidates

Ballot Candidate

623867 NO

820920 TTT

STATE HOUSE 50

023001 742
 820920 TTT

 STATE HOUSE 58
 RACE # 355

P. CANNON (I) D 120
 Write-in 1
 # WRITE-INS 1

Write In Candidates
 Ballot Candidate
 623867 NO

 CO COMM CHAIRPERSON
 RACE # 450

R. PITTS (I) D 118
 Write-in 2
 # WRITE-INS 2
 Write In Candidates
 Ballot Candidate
 623867 NO
 398108 NO GULCH

 SOIL AND WATER
 RACE # 550

W. S. REKUC, JR (I) 83
 J. R. ULSETH 89
 Write-in 1
 Write-in 0
 # WRITE-INS 1

Write In Candidates
 Ballot Candidate
 34321 JAWN KHAN

 CONST AMENDMENT 1
 RACE # 560

YES 121
 NO 17

 CONST AMENDMENT 2
 RACE # 570

YES 76
 NO 58

 ELECTION RESULTS REPORT

 Fulton County
 State of
 Georgia General Election

November 6, 2018
 DATE: Nov-06-2018
 POLL CTR: 280N00
 02J, 02K & 06G
 MACHINE ID: 5
 VERSION: 2 COPY: 0
 COUNT: 0 SIZE: 32M
 ACCU-VOTE RELEASE: 4, 5, 2
 REPORT: US 1, 14, 7

TIME: 19:29 11/06/2018
 MACHINE SERIAL: 128841
 PUBLIC COUNTER: 138
 SYSTEM COUNTER: 2375

 *** SUMMARY TOTALS

BALLOTS CAST BY PRECINCT	
PRECINCT	QUANTITY
220	83
225	39
	16
	*
TOTAL BALLOTS	138

GOVERNOR
RACE # 3

B. KEMP (R)	18
S. ABRAMS (D)	117
T. METZ (L)	2
Write-in	1
# WRITE-INS	1

Write In Candidates

Ballot Candidate

872507 LEE ANN ROTH GAMBLE

LT GOVERNOR

RACE # 5

G. DUNCAN (R)	18
S. R. AMICO (D)	114
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

SECRETARY OF STATE

RACE # 7

D. RAFFENSPERGER (R)	19
J. BARROW (D)	109
S. DUVAL (L)	5
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

ATTORNEY GENERAL

RACE # 9

C. CARR (I) R	22
C. BAILEY (D)	111
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

AGRICULTURE COMMISSIONER
RACE # 11

G. BLACK (I) R	28
F. SWANN (D)	102
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

INSURANCE COMMISSIONER

RACE # 13

J. BECK (R)	19
J. LAWS (D)	104
D. FOSTER (L)	9
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

STATE SCHOOL SUPERINTENDENT

RACE # 15

R. WOODS (I) R	22
O. THORNTON, JR. (D)	109
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

LABOR COMMISSIONER

RACE # 17

M. BUTLER (I) R	18
R. KEATLEY (D)	109
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

PSC EATON
RACE # 19

C. EATON (I) R	20
L. MILLER (D)	105
R. GRAHAM (L)	4
Write-in	0
# WRITE-INS	0

Write In Candidates
Ballot Candidate

PSC PRIDEMORE
RACE # 21

T. PRIDEMORE (I) R	19
D. A. RANDOLPH (D)	104
J. TURPISH (L)	6
Write-in	0
# WRITE-INS	0

Write In Candidates
Ballot Candidate

US HOUSE 5
RACE # 40

J. R. LEWIS (I) D	123
Write-in	3
# WRITE-INS	3

Write In Candidates
Ballot Candidate

15128 ANYBODY ELSE
59890 ERIC BROWN
47575 ROD WINGATE

US HOUSE 6
RACE # 55

J. HANDEL (I) R	0
W. BATH (D)	2
Write-in	0
WRITE-INS	2

Write In Candidates
Ballot Candidate

ATE SENATE 36
CE # 145

ORROCK (I) D	123
te-in	2
WRITE-INS	2

te In Candidates
lot Candidate

124 ANYBODY ELSE
575 TOM HARP

TE HOUSE 58
E # 355

CANNON (I) D	123
te-in	2
RITE-INS	2

te In Candidates
lot Candidate

124 ANYBODY ELSE
575 MONA CONMAN

COMM CHAIRPERSON
450

UTTS (I) D	119
te-in	3
ITE-INS	3

te In Candidates
ot Candidate

24 ANYBODY ELSE
34 DONALD DUCK
75 WALTER SMITH

AND WATER
550

AND WATER
550

REKUC, JR (I)	91
ULSETH	76
-in	1
-in	0
TE-INS	1
In Candidates	
Candidate	
B BERT	

AMENDMENT 1	
# 560	
	131
	6

AMENDMENT 2	
570	
	72
	56

AMENDMENT 3	
580	

ELECTION RESULTS REPORT

Fulton County
State of
Georgia General Election

November 6, 2018
DATE: Nov-06-2018
POLL CTR: 280000
02J, 02K & 06G
MACHINE ID: 6
VERSION: 2 COPY: 0
COUNT: 0 SIZE: 32M
ACCU-VOTE RELEASE: 4, 5, 2
REPORT: US 1, 14, 7

TIME: 19:26 11/06/2018
MACHINE SERIAL: 133778
PUBLIC COUNTER: 125
SYSTEM COUNTER: 8130

*** SUMMARY TOTALS

PRECINCT	QUANTITY
220	61
225	56
700	8
TOTAL BALLOTS	125

GOVERNOR

RACE # 3

B. KEMP (R) 18

S. ABRAMS (D) 107

T. METZ (L) 2

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

LT GOVERNOR

RACE # 5

G. DUNCAN (R) 20

S. R. AMICO (D) 105

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

SECRETARY OF STATE

RACE # 7

B. RAFFENSPERGER (R) 17

J. BARROW (D) 102

S. DUVAL (L) 5

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

ATTORNEY GENERAL

RACE # 9

C. CARR (I) R 23

C. BAILEY (D) 101

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

Write In Candidates

Ballot Candidate

AGRICULTURE COMMISSIONER

RACE # 11

G. BLACK (I) R 26

F. SWANN (D) 95

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

INSURANCE COMMISSIONER

RACE # 13

J. BECK (R) 19

J. LAWS (D) 97

D. FOSTER (L) 7

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

STATE SCHOOL SUPERINTENDENT

RACE # 15

R. WOODS (I) R 22

O. THORNTON, JR. (D) 101

Write-in * * 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

LABOR COMMISSIONER

RACE # 17

M. BUTLER (I) R 20

R. KEATLEY (D) 101

Write-in 1

WRITE-INS 1

Write In Candidates

Ballot Candidate

PSC EATON

RACE # 19

C. EATON (I) R	20
L. MILLER (D)	97
R. GRAHAM (L)	6
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

PSC PRIDEMORE

RACE # 21

T. PRIDEMORE (I) R	20
D. A. RANDOLPH (D)	98
J. TURPISH (L)	4
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

US HOUSE 5

RACE # 40

A. H. LEWIS (I) D	115
Write-in	3
# WRITE-INS	3

Write In Candidates

Ballot Candidate

SIGN ANYONE ELSE

SIGN CHARLES WALKER

SIGN NANCY BOWERS

STATE SENATE 36

RACE # 145

N. ORROCK (I) D	115
Write-in	1
# WRITE-INS	1

Write In Candidates

Ballot Candidate

740943 CHARLES WALKER

STATE HOUSE 58

RACE # 355

P. CANNON (I) D	111
Write-in	2
# WRITE-INS	2

Write In Candidates

Ballot Candidate

740943 CHSRLES WALKER

342140 NANCY BOWERS

CO COMM CHAIRPERSON

RACE # 450

R. PITTS (I) D	114
Write-in	1
# WRITE-INS	1

Write In Candidates

Ballot Candidate

740943 CHARLES WALKER

SOIL AND WATER

 SOIL AND WATER
 RACE # 550

W. S. REKUC, JR (I)	88
J. R. ULSETH	69
Write-in	1
Write-in	1
# WRITE-INS	2

Write In Candidates
 Ballot Candidate
 583353 GEORGE FOREMAN
 583353 LEBRON JAMES

 CONST AMENDMENT 1
 RACE # 560

YES	110
NO	13

 CONST AMENDMENT 2
 RACE # 570

YES	58
NO	61

 CONST AMENDMENT 3
 RACE # 580

YES	60
NO	63

 CONST AMENDMENT 4
 RACE # 590

YES	60
NO	63

 CONST AMENDMENT 5
 RACE # 600

YES	60
NO	63

 CONST AMENDMENT 6
 RACE # 610

YES	60
NO	63

 CONST AMENDMENT 7
 RACE # 620

YES	60
NO	63

 CONST AMENDMENT 8
 RACE # 630

YES	60
NO	63

 CONST AMENDMENT 9
 RACE # 640

YES	60
NO	63

 CONST AMENDMENT 10
 RACE # 650

YES	60
NO	63

 ELECTION RESULTS REPORT

 Fulton County
 State of
 Georgia General Election

November 6, 2018
 DATE: Nov-06-2018
 POLL CTR: 280P00
 02J, 02K & 08G
 MACHINE ID: 7
 VERSION: 2 COPY: 0
 COUNT: 0 SIZE: 32M
 ACCU-VOTE RELEASE: 4, 5, 2
 REPORT: US 1, 14, 7

TIME: 19:27 11/06/2018
 MACHINE SERIAL: 110984
 PUBLIC COUNTER: 135
 SYSTEM COUNTER: 5071

 *** SUMMARY TOTALS

BALLOTS CAST BY PRECINCT	
PRECINCT	QUANTITY
220	78
225	40
TOTAL	117
TOTAL BALLOTS	135

 GOVERNOR

GOVERNOR

RACE # 3

B. KEMP (R) 18
 S. ABRAMS (D) 117
 T. METZ (L) 0
 Write-in 0
 # WRITE-INS 0
 Write In Candidates
 Ballot Candidate

LT GOVERNOR

RACE # 5

G. DUNCAN (R) 20
 S. R. AMICO (D) 110
 Write-in 0
 # WRITE-INS 0
 Write In Candidates
 Ballot Candidate

SECRETARY OF STATE

RACE # 7

B. RAFFENSPERGER (R) 22
 J. BARROW (D) 105
 S. DUVAL (L) 5
 Write-in 0
 # WRITE-INS 0
 Write In Candidates
 Ballot Candidate

ATTORNEY GENERAL

RACE # 9

C. CARR (I) R 24

ATTORNEY GENERAL

RACE # 9

C. CARR (I) R 24
 C. BAILEY (D) 107
 Write-in 0
 # WRITE-INS 0
 Write In Candidates
 Ballot Candidate

AGRICULTURE COMMISSIONER

RACE # 11

G. BLACK (I) R 29
 F. SWANN (D) 100
 Write-in 0
 # WRITE-INS 0
 Write In Candidates
 Ballot Candidate

INSURANCE COMMISSIONER

RACE # 13

J. BECK (R) 23
 J. LAWS (D) 100
 D. FOSTER (L) 6
 Write-in 0
 # WRITE-INS 0
 Write In Candidates
 Ballot Candidate

STATE SCHOOL SUPERINTENDENT

RACE # 15

R. WOODS (I) R 27
 D. THORNTON, JR. (D) 102
 Write-in 0
 # WRITE-INS 0
 Write In Candidates
 Ballot Candidate

LABOR COMMISSIONER
RACE # 17

M. BUTLER (I) R 27
R. KEATLEY (D) 101
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

PSC EATON
RACE # 19

C. EATON (I) R 23
L. MILLER (D) 102
R. GRAHAM (L) 6
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

PSC PRIDEMORE
RACE # 21

T. PRIDEMORE (I) R 25
D. A. RANDOLPH (D) 101
J. TURPISH (L) 4
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

US HOUSE 5
RACE # 40

A. R. LEWIS III D 170
Write-in 4
WRITE-INS 4

Write In Candidates
Ballot Candidate

SABIN MATT RIES
THOMAS NICK FRODO
STONY STEVEN FILES
STONY STEVE

STATE SENATE 36
RACE # 145

N. ORROCK (I) D 114
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

STATE HOUSE 58
RACE # 355

P. CANNON (I) D 114
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

CD COMM CHAIRPERSON
RACE # 450

R. PITTS (I) D 111
Write-in 1
WRITE-INS 1

Write In Candidates
Ballot Candidate

152278 OLAF

SOIL AND WATER
RACE # 550

V. S. REKUC, JR (I) 89
J. R. ULSETH 85
Write-in 1
Write-in 0
Write-in 1

WRITE-INS

Write In Candidates

Ballot Candidate

THOMAS NICK FRODO

STONY STEVEN FILES

STONY STEVE

RACE # 1000

 CONST AMENDMENT 1
 RACE # 560

YES 119
 NO 12

 CONST AMENDMENT 2
 RACE # 570

YES 65
 NO 59

 CONST AMENDMENT 3
 RACE # 580

YES 84
 NO 43

 CONST AMENDMENT 4
 RACE # 590

YES 80
 NO 42

 CONST AMENDMENT 5
 RACE # 600

YES 100
 NO 100

 REFERENDUM A
 RACE # 610

 ELECTION RESULTS REPORT

 Fulton County
 State of
 Georgia General Election

November 6, 2018
 DATE: Nov-06-2018
 POLL CTR: 280000
 02J, 02K & 06G
 MACHINE ID: 8
 VERSION: 2 COPY: 0
 COUNT: 0 SIZE: 32M
 ACCU-VOTE RELEASE: 4, 5, 2
 REPORT: US 1, 14, 7

TIME: 19:28 11/06/2018
 MACHINE SERIAL: 125680
 PUBLIC COUNTER: 140
 SYSTEM COUNTER: 1518

 *** SUMMARY TOTALS

BALLOTS CAST BY PRECINCT

PRECINCT	QUANTITY
220	85
225	39
700	16
TOTAL BALLOTS	140

 GOVERNOR
 PAGE # 2

TOTAL BALLOTS 140

GOVERNOR

RACE # 3

B. KEMP (R) 15

S. ABRAMS (D) 124

T. METZ (L) 1

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

LT GOVERNOR

RACE # 5

G. DUNCAN (R) 19

S. R. AMICO (D) 115

Write-in 1

WRITE-INS 1

Write In Candidates

Ballot Candidate

977068 JOE BIDEN

SECRETARY OF STATE

RACE # 7

WAFFENSPERGER (R) 16

J. BARROW (D) 109

S. DUVAL (L) 11

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

ATTORNEY GENERAL

RACE # 9

C. CARR (I) R 22

C. BAILEY (D) 111

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

AGRICULTURE COMMISSIONER

RACE # 11

BLACK (I) R 31

SWANN (D) 103

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

INSURANCE COMMISSIONER

RACE # 13

BECK (R) 20

LAWS (D) 103

FOSTER (L) 7

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

STATE SCHOOL SUPERINTENDENT

RACE # 15

WOODS (I) R 29

THORNTON, JR. (D) 102

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

DR COMMISSIONER

RACE # 17

BUTLER (I) R 24

HEATLEY (D) 106

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

TUN

19

ATON (I) R	20
LLER (D)	104
RAHAM (L)	8
-in	0
TE-INS	0

In Candidates
t Candidate

RIDEMORE

21

IDEMORE (I) R	18
RANDOLPH (D)	107
PISH (L)	0
in	0
E-INS	0

In Candidates
Candidate

SE 5

40

EWIS (I) D	129
n	0
-INS	0

n Candidates
Candidate

TE 36

I) D	124
	1
	1

ndidates

tate

SE RETIRE

58

D	122
	0
	0

idates

tate

PERSON

	121
	0
	0

dates

te

(I)	95
	72
	0
	0
	0

 ELECTION RESULTS REPORT

 Fulton County
 State of
 Georgia General Election

November 6, 2018
 DATE: Nov-06-2018
 POLL CTR: 280R00
 02J, 02K & 06G
 MACHINE ID: 9
 VERSION: 2 COPY: 0
 COUNT: 0 SIZE: 32M
 ACCU-VOTE RELEASE: 4,5,2
 REPORT: US 1, 14, 7

TIME: 19:24 11/06/2018
 MACHINE SERIAL: 107677
 PUBLIC COUNTER: 136
 SYSTEM COUNTER: 5229

 *** SUMMARY TOTALS

BALLOTS CAST BY PRECINCT

PRECINCT	QUANTITY
220	69
225	47
700	20
TOTAL BALLOTS	136

↓↓↓↓↓

GOVERNOR

RACE # 3

B. KEMP (R)	26
S. ABRAMS (D)	105
T. METZ (L)	5
Write-in	0
# WRITE-INS	0

Write In Candidates
 Ballot Candidate

 LT GOVERNOR

RACE # 5

G. DUNCAN (R)	35
S. R. AMICO (D)	98
Write-in	1
# WRITE-INS	1

Write In Candidates
 Ballot Candidate

655732 TED METZ

 SECRETARY OF STATE

RACE # 7

* B. RAFFENSPERGER (R) 28

RACE # 7

B. RAFFENSPERGER (R) 28
 J. BARROW (D) 99
 S. DUVAL (L) 6
 Write-in 0
 # WRITE-INS 0

Write In Candidates

Ballot Candidate

ATTORNEY GENERAL

RACE # 9

CARR (I) R 30
 BAILEY (D) 101
 Write-in 0
 # WRITE-INS 0

Write In Candidates

Ballot Candidate

AGRICULTURE COMMISSIONER

RACE # 11

G. BLACK (I) R 38
 F. SWANN (D) 93
 Write-in 0
 # WRITE-INS 0

Write In Candidates

Ballot Candidate

INSURANCE COMMISSIONER

INSURANCE COMMISSIONER

RACE # 13

J. BECK (R) 25
 J. LAWS (D) 93
 D. FOSTER (L) 14
 Write-in 0
 # WRITE-INS 0

Write In Candidates

Ballot Candidate

STATE SCHOOL SUPERINTENDENT

RACE # 15

R. WOODS (I) R 38
 O. THORNTON, JR. (D) 94
 Write-in 0
 # WRITE-INS 0

Write In Candidates

Ballot Candidate

LABOR COMMISSIONER

RACE # 17

M. BUTLER (I) R 34

COMMISSIONER

17

N. BUTLER (I) R 34
 R. KEATLEY (D) 97
 Write-in 0
 # WRITE-INS 0
 Write In Candidates
 Ballot Candidate

 PSC EATON
 RACE # 19

C. EATON (I) R 28
 L. MILLER (D) 93
 R. GRAHAM (L) 13
 Write-in 0
 # WRITE-INS 0
 Write In Candidates
 Ballot Candidate

 PSC PRIDEMORE
 RACE # 21

T. PRIDEMORE (I) R 29
 D. A. RANDOLPH (D) 91
 J. TURPISH (L) 13
 Write-in 0
 # WRITE-INS 0
 Write In Candidates
 Ballot Candidate

 US HOUSE 5
 RACE # 40

J. R. LEWIS (I) D 113
 Write-in 7
 # WRITE-INS 7
 Write In Candidates
 Ballot Candidate
 MISSING ADAM DANIEL GREY
 AGGREG ANYONE BUT LEWIS
 TERRY BUCKLEY DUKE
 KENNEDY CHRIS CURNICK
 KENNEDY JACOB BURNHILL
 ZOBAR PE
 BOSSARD TED METZ

STATE SENATE 36

RACE # 145

N. ORROCK (I) D 110
 Write-in 4
 # WRITE-INS 4

Write In Candidates

Ballot Candidate

173300 BUCKLEY DUKE

819362 CHRIS CURNICK

468884 KATHERINE HALL

655732 TED METZ

STATE HOUSE 58

RACE # 355

P. CANNON (I) D 107
 Write-in 4
 # WRITE-INS 4

Write In Candidates

Ballot Candidate

173300 BUCKLEY DUKE

819362 CHRIS CURNICK

468884 HART WILLOUGHBY

655732 TED METZ

CO COMM CHAIRPERSON

CO COMM CHAIRPERSON

RACE # 450

R. PITTS (I) D 108

Write-in 5

WRITE-INS 5

Write In Candidates

Ballot Candidate

173300 BUCKLEY DUKE

819362 CHRIS CURNICK

399513 KRISTIN HALLORAN

20690 ME

655732 TED METZ

SOIL AND WATER

RACE # 550

W. S. REKUC, JR (I) 88

J. R. ULSETH 78

Write-in 0

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

CONST AMENDMENT 1

RACE # 580

ELECTION RESULTS REP

Fulton County

State of

Georgia General Election

November 6, 2018

DATE: Nov-06-2018

POLL CTR: 280[00

02J, 02K & 06G

MACHINE ID: 10

VERSION: 2 COPY: 0

COUNT: 0 SIZE: 32M

ACCU-VOTE RELEASE: 4, 5, 2

REPORT: US 1, 14, 7

TIME: 19:28 11/06/2018

MACHINE SERIAL: 124373

PUBLIC COUNTER: 37

SYSTEM COUNTER: 11546

*** SUMMARY TOTALS

E-CAST BY PRECINCT

PRECINCT QUANTITY

220 19

225 17

700 1

TOTAL BALLOTS 37

GOVERNOR

RACE # 3

B. KEMP (R)	4
S. ABRAMS (D)	33
T. METZ (L)	0
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

LT GOVERNOR

RACE # 5

G. DUNCAN (R)	5
S. R. AMICO (D)	32
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

SECRETARY OF STATE

RACE # 7

B. RAFFENSPERGER (R)	6
L. BARROW (D)	29
D. DUVAL (L)	1
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

ATTORNEY GENERAL

RACE # 9

C. CARR (I) R	8
C. BAILEY (D)	28
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

AGRICULTURE COMMISSIONER

RACE # 11

G. BLACK (I) R	9
F. SVANN (D)	28
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

INSURANCE COMMISSIONER

RACE # 13

J. BECK (R)	7
J. LAWS (D)	28
D. FOSTER (L)	1
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

STATE SCHOOL SUPERINTENDENT

RACE # 15

R. WOODS (I) R	8
O. THORNTON, JR. (D)	28
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

LABOR COMMISSIONER

RACE # 17

M. BUTLER (I) R	7
R. KEATLEY (D)	27
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

PSC EATON

RACE # 19

G. EATON (I) R	7
L. MILLER (D)	28
R. GRAHAM (L)	3
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

PSC PRIDEMORE

RACE # 21

T. PRIDEMORE (I) R 7

D. A. RANDOLPH (D) 24

I. TURPISH (L) 3

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

US HOUSE 5

RACE # 40

J. R. LEWIS (I) D 32

Write-in 1

WRITE-INS 1

Write In Candidates

Ballot Candidate

733772 TAYLOR HARRISON

STATE SENATE 35
RACE # 145

N. DORRICK (I) D 32

Write-in 1

WRITE-INS 1

Write In Candidates

Ballot Candidate

733772 TAYLOR HARRISON

STATE HOUSE 58

RACE # 355

P. CANNON (I) D 32

Write-in 1

WRITE-INS 1

Write In Candidates

Ballot Candidate

733772 TAYLOR HARRISON

CO COMM CHAIRPERSON

RACE # 450

R. PITTS (I) D 33

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

SOIL AND WATER

RACE # 550

W. S. REXLUC, JR (I) 38

J. R. ULSETH 18

Write-in 0

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

CONST AMENDMENT 1

RACE # 580

YES 36

NO 1

CONST AMENDMENT 2

RACE # 570

YES 30

NO 14

CONST AMENDMENT 3

RACE # 560

YES

 ELECTION RESULTS REPORT

 Fulton County
 State of
 Georgia General Election

November 6, 2018
 DATE: Nov-06-2018
 POLL CTR: 280\00
 02J, 02K & 06G
 MACHINE ID: 11
 VERSION: 2 COPY: 0
 COUNT: 0 SIZE: 32M
 ACCU-VOTE RELEASE: 4, 5, 2
 REPORT: US 1, 14, 7

TIME: 19:27 11/06/2018
 MACHINE SERIAL: 149744
 PUBLIC COUNTER: 44
 SYSTEM COUNTER: 5974

 *** SUMMARY TOTALS

BALLOTS CAST BY PRECINCT

PRECINCT	QUANTITY
220	22
225	15
700	7
TOTAL BALLOTS	44

 GOVERNOR
 RACE # 3

B. KEMP (R)	13
S. ABRAMS (D)	29
T. METZ (L)	2
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

 LT GOVERNOR
 RACE # 5

G. DUNCAN (R)	13
S. R. AMICO (D)	30
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

 SECRETARY OF STATE
 RACE # 7

B. RAFFENSPERGER (R)	11
J. BARROW (D)	30
S. DUVAL (L)	3
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

 ATTORNEY GENERAL
 RACE # 9

CARR (I) R	15
BAILEY (D)	28
Write-in	0
WRITE-INS	0
Write In Candidates	
Ballot Candidate	

```

*****
AGRICULTURE COMMISSIONER
ACE # 11

BLACK (I) R      16
SWANN (D)        26
ite-in           0
WRITE-INS        0
ite In Candidates
lot Candidate
*****
SURANCE COMMISSIONER
CE # 13

BECK (R)         13
LAWS (D)         27
FOSTER (L)       4
te-in            0
RITE-INS         0
te In Candidates
lot Candidate
*****
TE SCHOOL SUPERINTENDENT
E # 15

WOODS (I) R      17
THORNTON, JR. (D) 26
te-in            0
RITE-INS         0
te In Candidates
lot Candidate
*****
R COMMISSIONER
# 17

UTLER (I) R      16
EATLEY (D)       26
e-in             0
ITE-INS          0
e In Candidates
ot Candidate
*****

```

```

*****
EATON
# 19

ATON (I) R      11
LLER (D)        29
AHAM (L)        3
-in             0
TE-INS          0
In Candidates
t Candidate
*****
RIDEMORE
# 21

IDEMORE (I) R   12
RANDOLPH (D)    28
RPISH (L)       3
-in             0
TE-INS          0
In Candidates
Candidate
*****
SE 5
40

LEWIS (I) D     35
in              1
E-INS           1
In Candidates
Candidate
NOT
*****

```

NTE 36
 5
 (1) 0 35
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 E 58
 (1) 0 35
 1
 1
 candidates
 ddate

 (PERSON
 > 0 35
 1
 1
 candidates
 ddate

 EK
 A (1) 33
 75
 0
 0
 0
 candidates
 ddate

 NT 1
 36
 0

 ELECTION RESULTS REPORT

 Fulton County
 State of
 Georgia General Election

November 6, 2018
 DATE: Nov-06-2018
 POLL CTR: 280J00
 02J, 02K & 06G
 MACHINE ID: 12
 VERSION: 2 COPY: 0
 COUNT: 0 SIZE: 32M
 ACCU-VOTE RELEASE: 4, 5, 2
 REPORT: US 1, 14, 7

TIME: 19:26 11/06/2018
 MACHINE SERIAL: 144033
 PUBLIC COUNTER: 35
 SYSTEM COUNTER: 5751

 *** SUMMARY TOTALS
 *** *****

BALLOTS CAST BY PRECINCT

PRECINCT	QUANTITY
220	17
225	15
700	3
TOTAL BALLOTS	35

GOVERNOR

RACE # 3

B. KEMP (R)	7
S. ABRAMS (D)	27
T. METZ (L)	1
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

LT GOVERNOR

RACE # 5

G. DUNCAN (R)	9
S. R. AMICO (D)	25
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

SECRETARY OF STATE

RACE # 7

B. RAFFENSPERGER (R)	9
J. BARROW (D)	25
S. DUVAL (L)	1
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

ATTORNEY GENERAL

RACE # 9

C. CARR (I) R	9
C. BAILEY (D)	26
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

AGRICULTURE COMMISSIONER

RACE # 11

G. BLACK (I) R	10
F. SWANN (D)	24
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

INSURANCE COMMISSIONER

RACE # 13

J. BECK (R)	10
J. LAWS (D)	23
D. FOSTER (L)	1
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

STATE SCHOOL SUPERINTENDENT

RACE # 15

R. WOODS (I) R	9
O. THORNTON, JR. (D)	24
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

LABOR COMMISSIONER

RACE # 17

M. BUTLER (I) R	10
R. KEATLEY (D)	23
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

PSC EATON
RACE # 19

C. EATON (I) R	8
L. MILLER (D)	24
R. GRAHAM (L)	1
Write-in	0
# WRITE-INS	0

Write In Candidates
Ballot Candidate

PSC PRIDEMORE
RACE # 21

T. PRIDEMORE (I) R	9
D. A. RANDOLPH (D)	23
J. TURPISH (L)	1
Write-in	0
# WRITE-INS	0

Write In Candidates
Ballot Candidate

US HOUSE 5
RACE # 40

J. R. LEWIS (I) D	30
Write-in	2
# WRITE-INS	2

Write In Candidates
Ballot Candidate271598 JOHN ADAMS
650976 NICK SABAN

STATE SENATE 38
RACE # 145

N. DRROCK (I) D	29
Write-in	2
# WRITE-INS	2

Write In Candidates

Ballot Candidate

271598 JOHN ADAMS

650976 NICK SABAN

STATE HOUSE 58
RACE # 355

P. CANNON (I) D	29
Write-in	2
# WRITE-INS	2

Write In Candidates

Ballot Candidate

271598 JOHN ADAMS

650976 NICK SABAN

CO COMM CHAIRPERSON
RACE # 450

R. PITTS (I) D	26
Write-in	2
# WRITE-INS	2

Write In Candidates

Ballot Candidate

271598 JOHN ADAMS

650976 NICK SABAN

SOIL AND WATER

RACE # 550

W. S. REKUC, JR (I)	16
J. R. ULSETH	17
Write-in	0
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

CONST AMENDMENT 1

RACE # 580

YES	34
NO	0

CONST AMENDMENT 2

RACE # 570

YES	21
NO	0

 ELECTION RESULTS REPORT

 Fulton County
 State of
 Georgia General Election

November 6, 2018

DATE: Nov-06-2018

POLL CTR: 280^00

02J, 02K & 06G

MACHINE ID: 13

VERSION: 2 COPY: 0

COUNT: 0 SIZE: 32M

ACCU-VOTE RELEASE: 4, 5, 2

REPORT: US 1, 14, 7

TIME: 19:31 11/06/2018

MACHINE SERIAL: 116073

PUBLIC COUNTER: 37

SYSTEM COUNTER: 4718

*** SUMMARY TOTALS

BALLOTS CAST PRECINCT

PRECINCT QUANTITY

220 15

225 15

700 7

TOTAL BALLOTS 37

GOVERNOR

RACE # 3

B. KEMP (R) 8

S. ABRAMS (D) 27

T. METZ (L) 2

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

LT GOVERNOR

RACE # 5

G. DUNCAN (R) 10

S. R. AMICO (D) 24

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

SECRETARY OF STATE

RACE # 7

B. RAFFENSPERGER (R) 9

J. BARROW (D) 25

S. DUVAL (L) 2

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

ATTORNEY GENERAL

RACE # 9

C. CARR (I) R 11

C. BAILEY (D) 24

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

AGRICULTURE COMMISSIONER

RACE # 11

G. BLACK (I) R 12

F. SWANN (D) 21

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

INSURANCE COMMISSIONER

RACE # 13

J. BECK (R) 9

J. LAWS (D) 22

O. FOSTER (L) 3

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

STATE SCHOOL SUPERINTENDENT

RACE # 15

R. WOODS (I) R 12

O. THORNTON, JR. (D) 20

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

LABOR COMMISSIONER

RACE # 17

M. BUTLER (I) R 10

R. KEATLEY (D) 22

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

PSC EATON

RACE # 19

C. EATON (I) R 9

L. MILLER (D) 23

R. GRAHAM (L) 3

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

PSC PRIDEMORE

RACE # 21

T. PRIDEMORE (I) R 9

D. A. RANDOLPH (D) 22

J. TURPISH (L) 3

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

US HOUSE 5

RACE # 40

J. R. LEWIS (I) D 26

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

STATE SENATE 30
RACE # 125

N. DOROCK (I) D 25
Write-In 1
WRITE-INS 1

Write In Candidates
Ballot Candidate
30448 JEN ALIPKOFF

STATE HOUSE 50
RACE # 355

P. CANNON (I) D 25
Write-In 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

CO COMM CHAIRPERSON
RACE # 450

R. PITTS (I) D 25
Write-In 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

SOIL AND WATER
RACE # 550

M. S. REXUC, JR (I) 20
J. R. ULSETH 14
Write-In 0
Write-In 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

CONST AMENDMENT 1
RACE # 560

YES 30
NO 3

CONST AMENDMENT 2
RACE # 570

YES 28
NO 11

CONST AMENDMENT 3

ELECTION RESULTS REPORT

Fulton County
State of
Georgia General Election

November 6, 2018
DATE: Nov-06-2018
POLL CTR: 280_00
02J, 02K & 06G

MACHINE ID: 14
VERSION: 2 COPY: 0
COUNT: 0 SIZE: 32M
ACCU-VOTE RELEASE: 4, 5, 2
REPORT: US 1, 14, 7

TIME: 19:32 11/06/2018
MACHINE SERIAL: 123643
PUBLIC COUNTER: 39
SYSTEM CODE: 10292

*** SUMMARY TOTALS

BALLOTS CAST BY PRECINCT	
PRECINCT	QUANTITY
220	17
225	16
700	6
TOTAL BALLOTS	39

GOVERNOR
RACE # 3

B. KEMP (R)	8
S. ABRAMS (D)	30
T. METZ (L)	1
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

LT GOVERNOR
RACE # 5

G. DUNCAN (R)	7
S. R. AMICO (D)	30
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

SECRETARY OF STATE
RACE # 7

B. RAFFENSPERGER (R)	6
J. BARROW (D)	28
S. DUVAL (L)	4
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

ATTORNEY GENERAL
RACE # 9

C. CARR (I) R	8
C. BAILEY (D)	28
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

AGRICULTURE COMMISSIONER
RACE # 11

G. BLACK (I) R	10
F. SWANN (D)	25
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

INSURANCE COMMISSIONER
RACE # 13

J. BECK (R)	8
J. LAWS (D)	25
D. FOSTER (L)	4
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

STATE SCHOOL SUPERINTENDENT
RACE # 15

K. WOODS (I) R	11
O. THORNTON, JR. (D)	26
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

LABOR COMMISSIONER
RACE # 17

M. BUTLER (I) R	10
R. KEATLEY (D)	25
Write-in	0
# WRITE-INS	0
Write In Candidates	
Ballot Candidate	

PSC EATON
RACE # 19

C. EATON (I) R	9
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PSC EATON

RACE # 19

C. EATON (I) R	9
L. MILLER (D)	24
R. GRAHAM (L)	4
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

PSC PRIDEMORE

RACE # 21

T. PRIDEMORE (I) R	8
D. A. RANDOLPH (D)	25
J. TURPISH (L)	4
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

US HOUSE 5

RACE # 40

J. R. LEWIS (I) D	33
Write-in	1
# WRITE-INS	1

Write In Candidates

Ballot Candidate

721789 RICK FLAIR

STATE SENATE 36

RACE # 145

N. ORROCK (I) D	30
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

STATE HOUSE 58

RACE # 355

P. CANNON (I) D	29
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

CO COMM CHAIRPERSON

RACE # 450

R. PITTS (I) D	30
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

SOIL AND WATER

RACE # 550

K. S. REKUC, JR (I)	25
J. R. ULSETH	15
Write-in	1
Write-in	0
# WRITE-INS	1

Write In Candidates

Ballot Candidate

148948 SALLY BETHAE

CONST AMENDMENT 1

RACE # 580

YES	30
NO	1

CONST AMENDMENT 2

RACE # 581

YES	30
NO	1

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ELECTION: (Check One) ☒ General
☐ Primary
☐ Runoff (if applicable)
☒ Special
☐ Presidential Preference Primary

USE BALL POINT PEN

Bear Down – You Are Making Three Copies

WHITE sheet to Secretary of State
 YELLOW sheet to Superintendent
 PINK sheet to Clerk of Superior Court or Municipal Clerk

DATE OF ELECTION November 6, 2018
 COUNTY / MUNICIPALITY Fulton
 PRECINCT 02J/K: 066

TIME LAST VOTER VOTED _____

NUMBER OF REGISTERED
 VOTERS IN PRECINCT _____

DIRECT RECORD ELECTRONIC VOTING MACHINE RECAP**SECTION A: RECORD EACH UNIT**

DRE UNIT NUMBER	Before Polls Open SEAL NUMBER	Before Polls Open COUNT NUMBER	After Polls Close SEAL NUMBER	After Polls Close COUNT NUMBER
<u>108255</u>	<u>0763016</u>	_____	_____	_____
<u>108510</u>	<u>0591785</u>	_____	_____	_____
<u>124301</u>	<u>0591769</u>	_____	_____	_____
<u>136081</u>	<u>0591800</u>	_____	_____	_____
<u>142944</u>	<u>0591796</u>	_____	_____	_____
<u>129841</u>	<u>0591772</u>	_____	_____	_____
<u>133778</u>	<u>0591750</u>	_____	_____	_____
<u>110984</u>	<u>0591773</u>	_____	_____	_____
<u>125680</u>	<u>0591741</u>	_____	_____	_____
<u>107677</u>	<u>0591738</u>	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

SECTION B: TOTAL OF ALL VOTES CAST (ALL UNITS COMBINED)**SECTION C: NUMBERED LISTS and VOTER CERTIFICATES**ExpressPoll (See ExpressPoll Recap)SupplementalTotal Voter's Certificates

Democratic Primary _____

Democratic Primary _____

Democratic Primary _____

Republican Primary _____

Republican Primary _____

Republican Primary _____

General/Special _____

General/Special _____

General/Special _____

Total (a) _____

Total (b) _____

Total (c) _____

SECTION D: TOTAL NUMBER OF PERSONS VOTING AS SHOWN BY:

- Results Tapes (or Accumulator Tape Results) (Total from Section B above) = _____
- "Voters Marked" (See ExpressPoll Recap) _____ + Supplemental List _____ = _____
- Numbered Lists on ExpressPoll (a) _____ + Supplemental (b) _____ = _____
- Voter's Certificates (c) _____ = _____

NOTE: Numbers from D1, D2, D3, and D4 should match. If not, explain difference here: _____

We, the undersigned Managers, hereby certify that the above is a true and correct accounting on this
 the _____ day of _____, 20____. **SIGNED IN TRIPLICATE**

Manager _____

Assistant Manager _____

Assistant Manager _____

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Georgia General Election

November 6, 2018

DATE: Nov-06-2018

POLL CTR: 1130/00

MIDVALE ELEM

VERSION: 1 COPY: 0

COUNT: 0 SIZE: 32M

ACCU-VOTE RELEASE: 4, 5, 2

REPORT: US 1, 14, 7

TIME: 19:45 11/06/2018

MACHINE SERIAL: 108936

PUBLIC COUNTER: 727

SYSTEM COUNTER: 5081

Accumulated Results For:

MachineId Copy Count

1 0 104

2 0 88

3 0 108

4 0 100

5 0 112

6 0 102

7 0 113

Total Count: 727

** PRECINCT: 1070 **

MIDVALE ELEM

BALLOTS CAST

BALLOT

QUANTITY

57

172

83

555

BLANK VOTED

UNDervOTED

WRITE-IN

235

43

Governor

RACE # 10

RUNNING 3

TO VOTE FOR 1

TIMES COUNTED 727

TIMES BLANK VOTED 3

B. KEMP (R) 389

S. ABRAMS (D) 307

T. METZ (L) 25

Write-in 3

WRITE-INS 3

Write In Candidates

Ballot Candidate

923217 GLORIFY JESUS

537209 LAURA ROLLMAN

453453 LEWIS BROWN

Lt Governor

RACE # 30

RUNNING 2

TO VOTE FOR 1

TIMES COUNTED 727

TIMES BLANK VOTED 28

G. DUNCAN (R) 406

S. R. AMICO (D) 292

Write-in 1

WRITE-INS 1

537209 LAURA ROLLMAN
453455 LEWIS BROWN

Lt Governor
RACE # 30
RUNNING 2
TO VOTE FOR 1

TIMES COUNTED 727
TIMES BLANK VOTED 28
G. DUNCAN (R) 406
S. R. AMICO (D) 292
Write-in 1
WRITE-INS 1

Write In Candidates
Ballot Candidate
923217 CHRIST ALONE

Secretary of State

RACE # 50
RUNNING 3
TO VOTE FOR 1

TIMES COUNTED 727
TIMES BLANK VOTED 19
B. RAFFENSPERGER (R) 390
J. BARROW (D) 282
S. DUVAL (L) 36
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

Attorney General

RACE # 70
RUNNING 2
TO VOTE FOR 1

TIMES COUNTED 727
TIMES BLANK VOTED 18
C. CARR (I) R 420
C. BAILEY (D) 289
Write-in 0
WRITE-INS 0

Write In Candidates
Ballot Candidate

Commissioner of Agriculture

RACE # 90
RUNNING 2
TO VOTE FOR 1

TIMES COUNTED 727
TIMES BLANK VOTED 18

RUNNING 2
TO VOTE FOR 1

# TIMES COUNTED	727
# TIMES BLANK VOTED	18
C. CARR (I) R	420
C. BAILEY (D)	289
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

Commissioner of Agriculture

RACE # 90

RUNNING 2

TO VOTE FOR 1

# TIMES COUNTED	727
# TIMES BLANK VOTED	29
G. BLACK (I) R	445
F. SWANN (D)	253
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

Commissioner of Insurance

RACE # 110

RUNNING 3

TO VOTE FOR 1

# TIMES COUNTED	727
# TIMES BLANK VOTED	24
J. BECK (R)	398
J. LAWS (D)	257
D. FOSTER (L)	48
Write-in	0
# WRITE-INS	0

Write In Candidates

Ballot Candidate

State School Superintendent

RACE # 130

RUNNING 2

TO VOTE FOR 1

# TIMES COUNTED	727
# TIMES BLANK VOTED	25
R. WOODS (I) R	442
D. THORNTON, JR. (D)	260
Write-in	0
# WRITE-INS	0

Write In Candidates

 RACE # 130

RUNNING 2

TO VOTE FOR 1

TIMES COUNTED 727

TIMES BLANK VOTED 25

R, WOODS (I) R 442

O, THORNTON, JR. (D) 260

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

Commissioner of Labor

RACE # 150

RUNNING 2

TO VOTE FOR 1

TIMES COUNTED 727

TIMES BLANK VOTED 30

M, BUTLER (I) R 438

R, KEATLEY (D) 259

Write-in 0

WRITE-INS 0

Write In Candidates

Ballot Candidate

PSC Eaton

RACE # 170

RUNNING 3

TO VOTE FOR 1

TIMES COUNTED 727

TIMES BLANK VOTED 24

C, EATON (I) R 379

L, MILLER (D) 271

R, GRAHAM (L) 51

Write-in 2

WRITE-INS 2

Write In Candidates

Ballot Candidate

943346 KRISTY HELLER

870295 STEPHANIE H SHANHOLTZER

PSC Pridemore

RACE # 180

RUNNING 3

TO VOTE FOR 1

TIMES COUNTED 727

TIMES BLANK VOTED 24

T, PRIDEMORE (I) R 384

O, A, RANDOLPH (D) 266

J, TURPISH (L) 50

Write-in 1

WRITE-INS 1

Write In Candidates

Ballot Candidate

943346 CHARLOTTE HELLEN

US House 6

RACE # 220

RUNNING 2

TO VOTE FOR 1

TIMES COUNTED 727

 RSC Pridemore
 RACE # 180
 # RUNNING 3
 # TO VOTE FOR 1

TIMES COUNTED 727
 # TIMES BLANK VOTED 24
 T. PRIDEMORE (I) R 384
 D. A. RANDOLPH (D) 268
 J. TURPISH (L) 50
 Write-in 1
 # WRITE-INS 1

Write In Candidates
 Ballot Candidate
 943346 CHAROTTE HELLER

US House 6
 RACE # 220
 # RUNNING 2
 # TO VOTE FOR 1

TIMES COUNTED 727
 # TIMES BLANK VOTED 9
 K. HANDEL (I) R 414
 L. MCBATH (D) 304
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

State Senate 40
 RACE # 250
 # RUNNING 2
 # TO VOTE FOR 1

TIMES COUNTED 727
 # TIMES BLANK VOTED 26
 F. MILLAR (I) R 398
 S. HARRELL (D) 303
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

State House 81
 RACE # 350
 # RUNNING 2
 # TO VOTE FOR 1

TIMES COUNTED 555
 # TIMES BLANK VOTED 13
 E. DIEHL (R) 309
 S. HOLCOMB (I) D 233
 Write-in 0
 # WRITE-INS 0

Write In Candidates
 Ballot Candidate

State House 87
 RACE # 430
 # RUNNING 1
 # TO VOTE FOR 1

TIMES COUNTED 172
 # TIMES BLANK VOTED 64
 V. DAVIS (D) 102

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Exhibit D

Midvale Elementary Precinct

DRE Election Night poll tape comparisons to Sec. of State official posted tallies for example races

Candidate/Contest	Midvale DRE Poll Tape	SOS Election Day Tally
Amico	292	328
Duncan	406	468
Lt. Gov. total	698	796
Total Ballots Cast	727	not available
Governor	724	824
Sec. of State	708	809
Attorney General	709	810

Note: similar patterns continue through all contests for which we have photograph of poll tape.